SAMS -01163

REFRIGERATOR

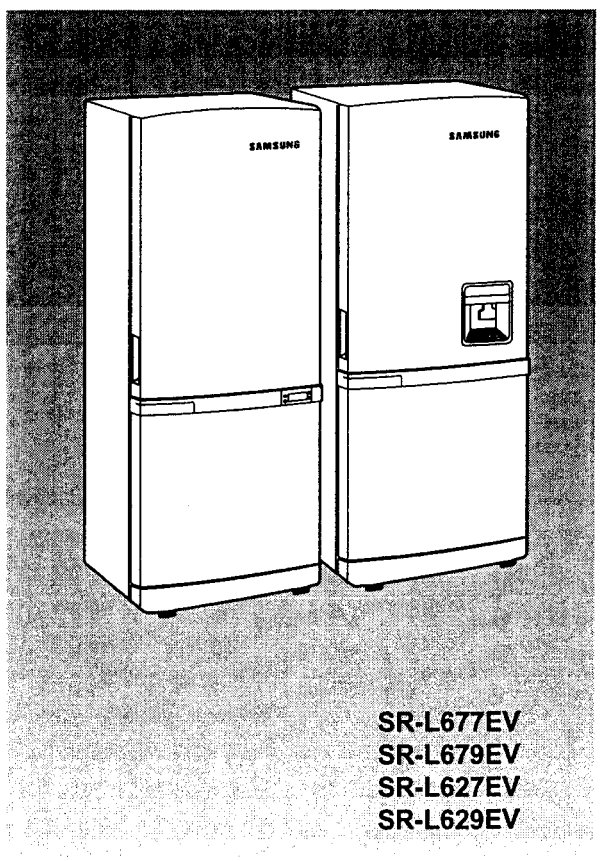
Model : SR-L677EV
SR-L679EV
SR-L627EV
SR-L629EV

CFC FREE
GREEN

SERVICE Manual

Refer Updated Service Manual to Refrigerator Web Site
http://www.e4buyer.com/refrigerator

REFRIGERATOR



SR-L677EV
SR-L679EV
SR-L627EV
SR-L629EV

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1. Precautions

Warning : Please abide by the following precautions in order to conduct the maintenance procedures in a safety fashion.

1-1. Caution when you replacing compressor.

- Do not smoke. Remove all the possible ignition sources and then replace compressor in well-aired places.
- Don't use welding machines if R600a refrigerant does not exposed.
- In the case of gas leakage, always open the windows.
- When cutting the SUCTION, DISCHARGE pipe of the compressor, always take caution of the inner pressure of the remaining gas.

1-2. Take out the power plug

- Always take out the power plug from the outlet when doing repairs.

1-3. Be careful of electric shocks

- When inspecting the circuit, don't touch the battery charger and be careful of electric shocks.

1-4. Use proper components

- Always use the component labeled in the service component chart when replacing components for repairs.

1-5. Use proper tools

- Always use proper tools for repairs. If worn out tools are used, it would cause defects in tuning and electrical contact, leading to accidents.

1-6. When doing repairs, inspect the **POWER CORD** or whether there is fire in the lead wire and make sure they are replaced.

1-7. Cutting of LEAD-WIRE

- For connecting the lead-wire that has been cut off, use soldering or connector and always disconnect the vinyl tapes.

1-8. Check for disconnection

- After completing the assembly, always measure the disconnection resistance level, and turn on the power after checking it is above 1MΩ.

1-9. Earth

- Check the status of earthing and repair the incomplete ones.

1-10. Be careful of children

- There is always the possibility of danger when doing repairs so make sure that children can't come nearby.

Cleaning : After completing repairs, clean the surrounding area and the refrigerator and tell the consumer about the repairs being made.

This appliance contains a small amount of the refrigerant isobutane(R600a), a natural gas with high environmental compatibility but which is also combustible. When transporting and installing the appliance, care should be taken to ensure that no parts of the refrigerating circuit are damaged. Refrigerant squirting out of the pipes could ignite or cause an eye injury. If damage occurs nevertheless, avoid any flames or potential sources of ignition, and air the room in which the appliance is standing for several minutes.

- In order to avoid the creation of a flammable gas-air mixture if a leak in the refrigerating circuit occurs, the size of the room in which the appliance may be sited depends upon the amount of refrigerant used. The room must be 1m³ in size for every 8 g of refrigerant R600a inside the appliance. The amount of refrigerant contained in your particular appliance is shown on the identification plate inside the appliance.
- Never start up an appliance showing any signs damage. If in doubt, consult your dealer.

	Refers to prohibition.
	Refers to prohibition of dismantling.
	Refers to prohibition of contact.
	Refers to guidelines which have to be followed.
	Refers to detaching the power plug from the outlet.
	Refers to earth connection for preventing electric shocks.

Warning	Refers to possibility of death or serious injury of a person.
Caution	Refers to possibility of injury of a person or damage to property.

2. Product Specifications

Model		SR-L629EV	SR-L679EV	SR-L627EV	SR-677EV
Type		LMF 2 Door			
Freezer performance		**** (4-STAR)			
Temperature control		Electronic control			
Water dispenser		Yes		No	
Net Capacity ℓ(ft³)	Total	501(17.69)	551(19.46)	506(17.87)	556(19.63)
	Freezer	143(5.05)	161(5.68)	143(5.05)	161(5.68)
	Refrigerator	358(12.64)	390(13.77)	363(12.82)	395(13.95)
Gross Capacity ℓ(ft³)	Total	526(18.57)	575(20.30)	531(18.75)	580(20.48)
	Freezer	168(5.93)	185(6.53)	168(5.93)	185(6.53)
	Refrigerator	358(12.64)	390(13.77)	363(12.82)	395(13.95)
Net dimension (W X D X H)		820 X 720 X 1790 (mm) (SR-L629(7)EV) 820 X 770 X 1790 (mm) (SR-L679(7)EV)			
Foam	Cabinet insulation	CYCLO-PENTANE			
	Door insulation	CYCLO-PENTANE			
Liner	Cabinet	A.B.S			
	Door	A.B.S			
Net weight		103Kg	108Kg	102Kg	107Kg

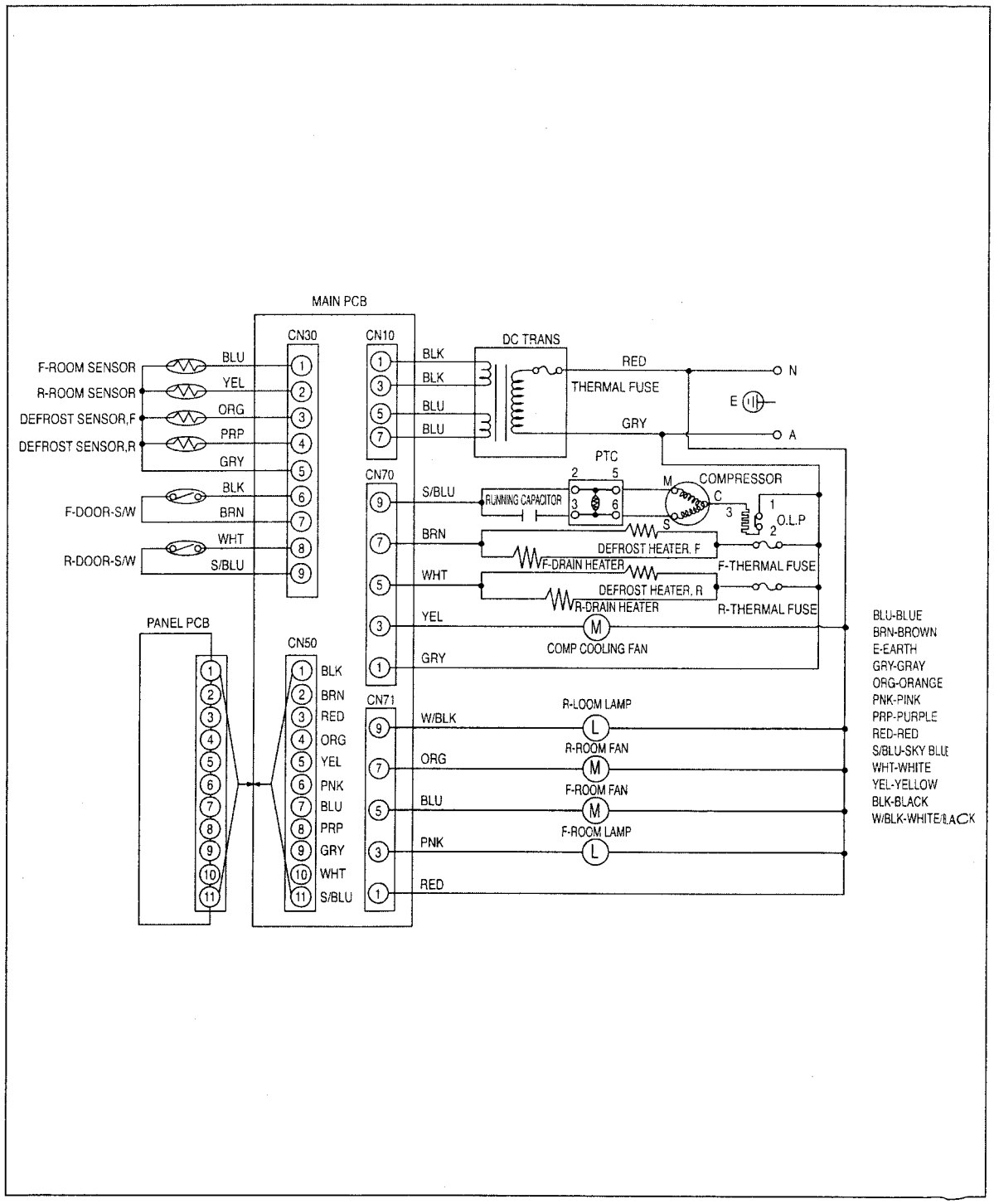
3. Electrical part specifications & standard

ITEM		STANDARD				
Model		SR-L629EV, SR-L679EV, SR-L627EV, SR-L677EV				
Rated Voltage		230-240V	230-240V	220V	127V	115V
Frequency		50HZ	50HZ	50-60HZ	60HZ	60HZ
Compressor	Model	MK4A3Q-L1U	DK182Q-L2U	SK190H-L2U	DK172P-L2U (MK172P-L2U)	DK172C-L2J (MK172C-L2J)
	Starting type	RSCR				
	Refrigerant	R600a	R134a			
	Oil Charge	2GSD(Mineral), 280cc	Freol α-15c(Ester), 265cc		Freol α-15c(Ester), 265cc (Freol α-10c(Ester), 265cc)	
Evaporator	Freezer	Split Fin & Tube Type				
	Refrigerator	Split Fin & Tube Type				
Condenser		Forced & Natural Convection Type				
Dryer		Molecular Sieve XH-9				
Capillary tube		ID0.82 x L3500, 5.10kg/cm²	ID0.82 X L3000 4.64kg/cm²			
Earth screw		BSBN(Brass screw)				
Door switch		DC12V 0.5A(S2PF101B)	AC250V 0.7A, AC125V 1.4A(SSD-6D)			

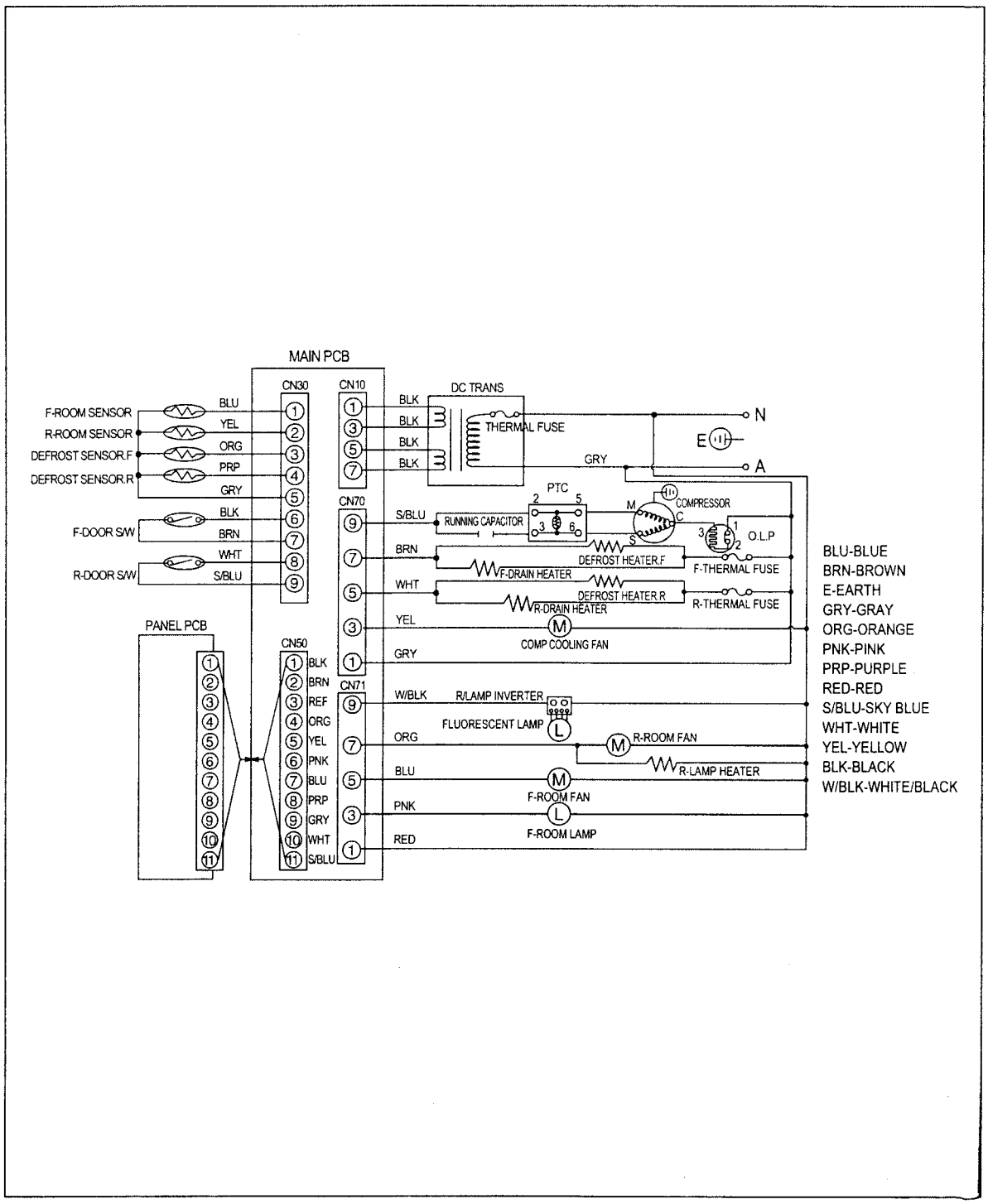
ITEM				STANDARD				
Temperature	Freezer	Type	Temperature Selection	ON(˚C)		OFF(˚C)		
		F-Sensor	-25˚C	-23.5˚C		-26.5˚C		
			-19˚C	-17.5˚C		-20.5˚C		
			-14˚C	-12.5˚C		-15.5˚C		
	Refrigerator	Type	Temperature Selection	ON(˚C)		OFF(˚C)		
		F-Sensor	1˚C	2.5˚C		-0.5˚C		
			4˚C	5.5˚C		2.5˚C		
			7˚C	8.5˚C		5.5˚C		
Electrical parts	Defrosting	First Defrost Cycle (Concurrent Defrost of F and R)		4hr ± 10min				
		Defrost Cycle(FRE)		6 - 22hr(Vary according to the conditions used)				
		Defrost Cycle(REF)		6 - 11hr(Vary according to the conditions used)				
		Pause Time		10 ± 2min				
	Sensor	Freezer-Sensor		THERMISTOR (502AT), SPEC:5.0KΩ AT 25˚C				
		Refrigerator-Sensor						
		FRE Evap-Sensor						
		REF Evap-Sensor						
		Ambient TEMP-Sensor						
	Heater	Defrost Heater(FRE)		242W (115V, 127V, 220V, 240V)				
		Drain Heater(FRE)		52W(115V, 127V, 220V, 240V)				
		Defrost Heater(REF)		120W(115V, 127V, 220V, 240V)				
		Drain Heater(REF)		38W(115V, 127V, 220V, 240V)				
	Fuse	Thermal-Fuse for preventing overheating of Freezer Defrost-Heater		AC250V 10A 77±5˚C				
		Thermal-Fuse for preventing overheating of Freezer Defrost-Heater						
	Rated Voltage			230-240V	230-240V	220V	127V	115V
	Frequency			50Hz	50Hz	50-60Hz	60Hz	60Hz
	Compressor			MK4A3Q-L1U	DK182Q-L2U	SK190H-L2U	DK172P-L2U (MK172P-L2U)	DK172C-L2U (MK172C-L2U)
	Condenser	STARTING		RSCR				
		RUNNING		350VAC, 3.5μF	350VAC, 5.0μF	350VAC, 8.0μF	250VAC, 12μF	250VAC, 12μF
	Over-Load Protector	MODEL		4TM232PHBYY-53	4TM265RHBYY-53	4TM314RHBYY-53	4TM435PHBYY-53	4TM437RHBYY-53
		TEMP. ON		125±5	130±5	130±5	125±5	130±5
		TEMP. OFF		69±9	69±9	69±9	69±9	69±9
	STARTING-RELAY	MODEL		J531Q35E330M385-2	J531Q35E330M385-2	J531Q34E220M3502	J531Q33E100M200-2	J531Q33E100M200-2
		OPERATION		33±20%	33±20%	22±20%	10±20%	10±20%
	MOTOR-FAN	FRE.		IS3210-SNL5C	IS3210-SNL5C	IS3210-SNF*B	IS3210-SNP6D	IS3210-SNP6D
		REF.		IS3208-SNL5B	IS3208-SNL5B	IS3208-SNF7D	IS3208-SNP6H	IS3208-SNP6H
		CIRCUIT		IS3208-SCL5A	IS3208-SCL5A	IS3208-SCF7A	IS3208-SC06A	IS3208-SCH6A
	LAMP	FRE.		240V/15W			110V-130V/15W	
		REF.		240V/25W			110V-130/30W	

4. Circuit Diagram

4-1. 230V-240V/50Hz, 220v/50Hz,60Hz, 127V/60Hz, 115V/60Hz

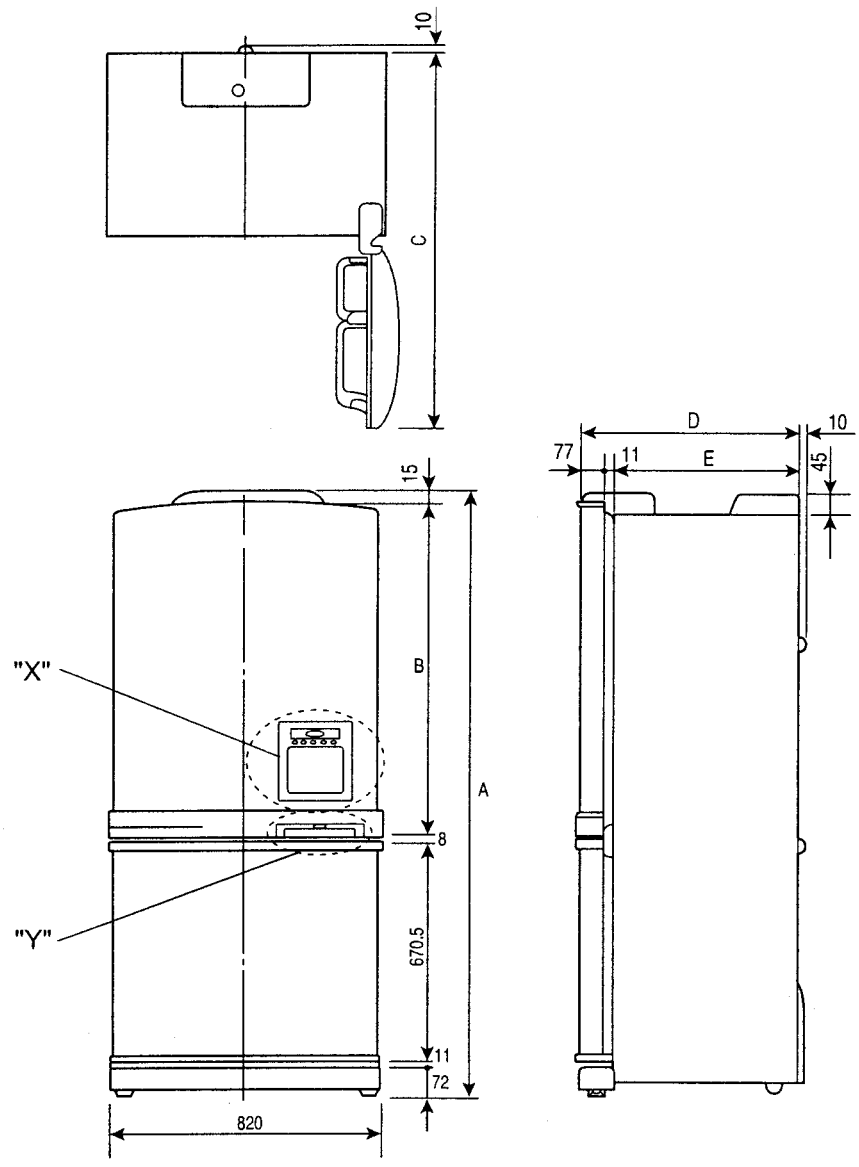


4-2. 230V-240V/50Hz, 60Hz, 220V/50Hz,60Hz, 127V/60Hz, 50Hz, 115V/50V,60Hz(INVERTER PCB)



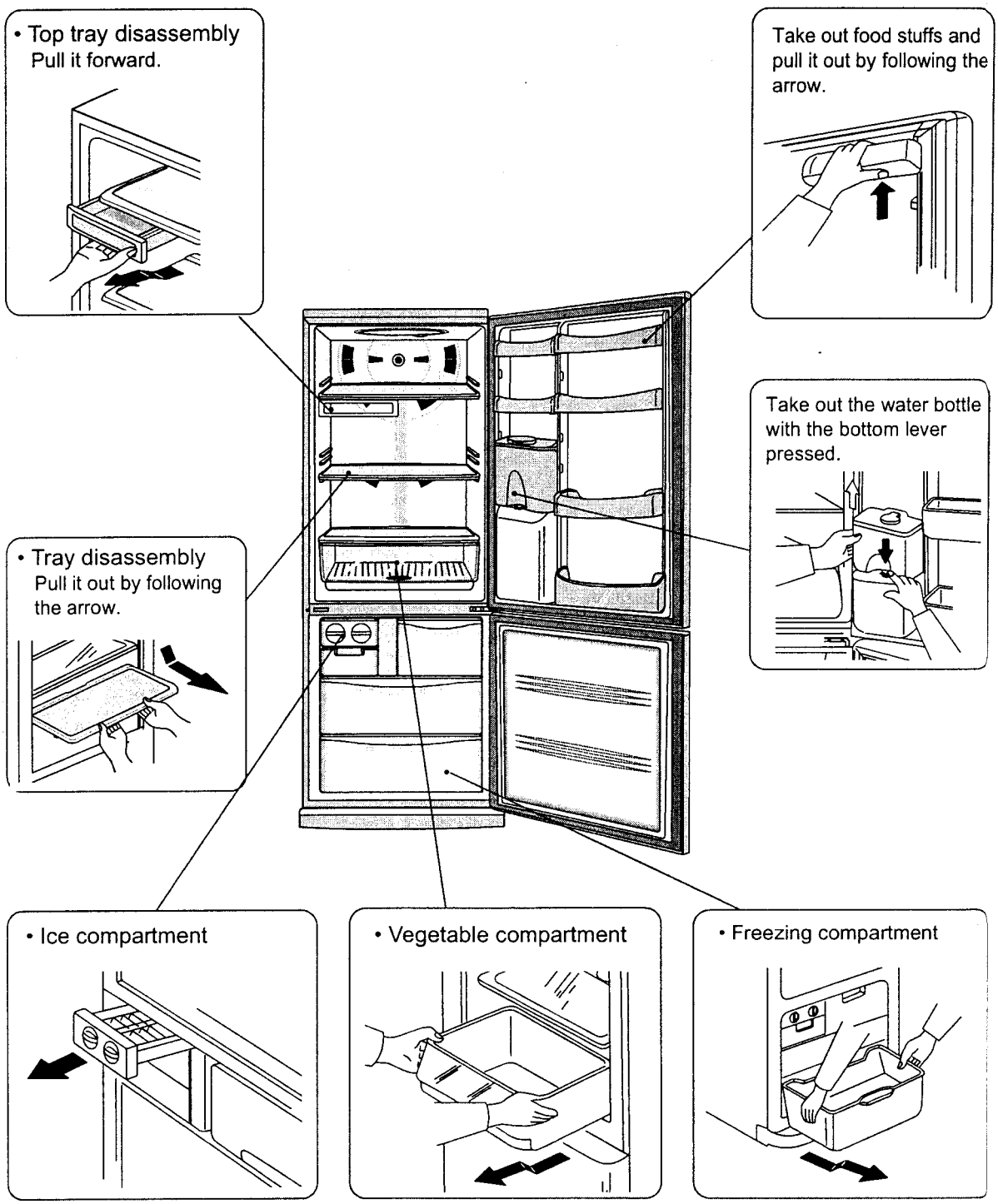
5. Function & Operating Instruction

5-1. Product Dimension



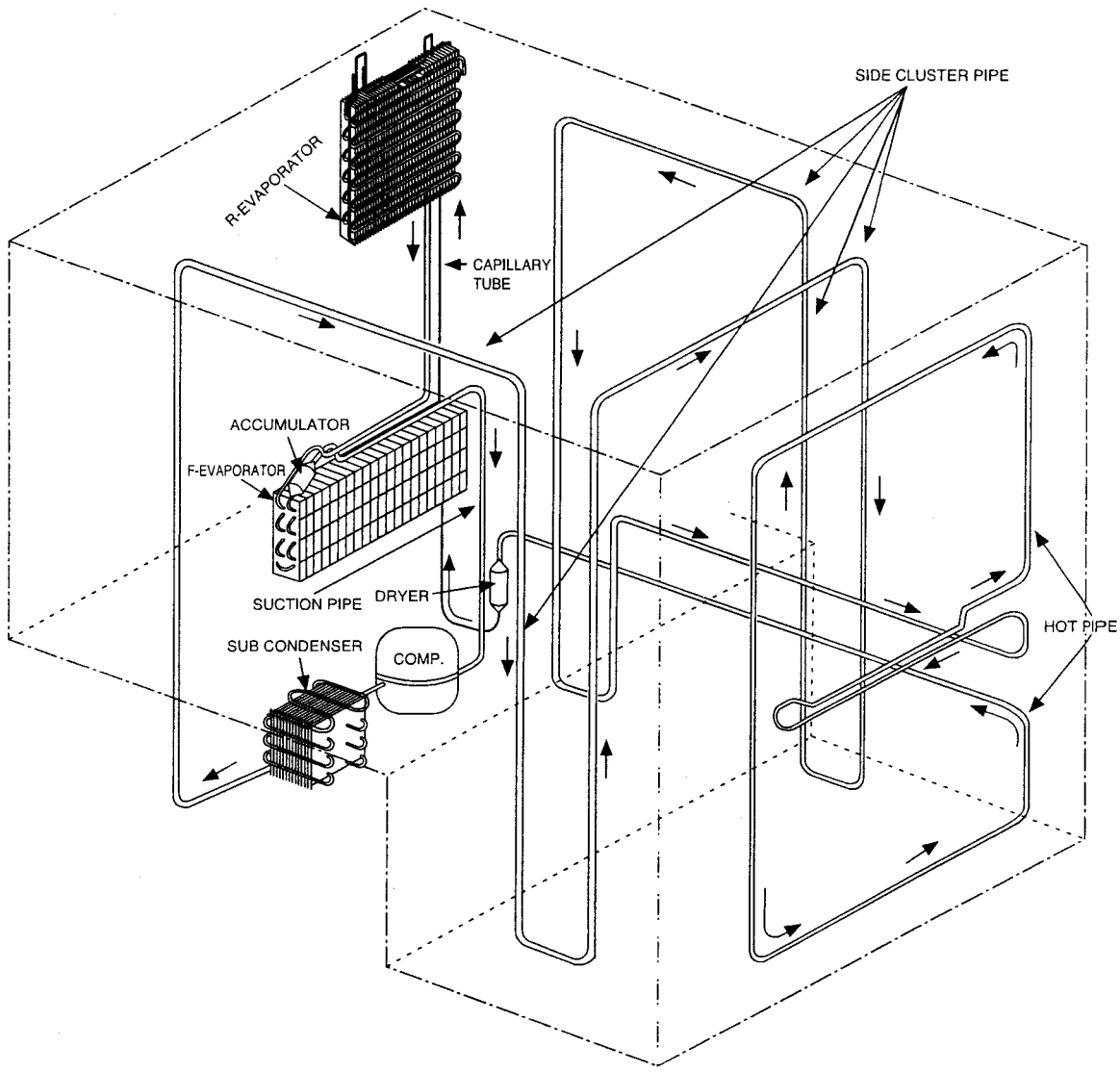
MODEL	A	B	C	D	E	Remarks
SR-L679EV	1790	1013.5	1508	755	667	"X"
SR-L677EV	1790	1013.5	1508	755	667	"Y"
SR-L629EV	1790	1013.5	1458	705	617	"X"
SR-L627EV	1790	1013.5	1458	705	617	"Y"

5-2. Part Name & Disassembly

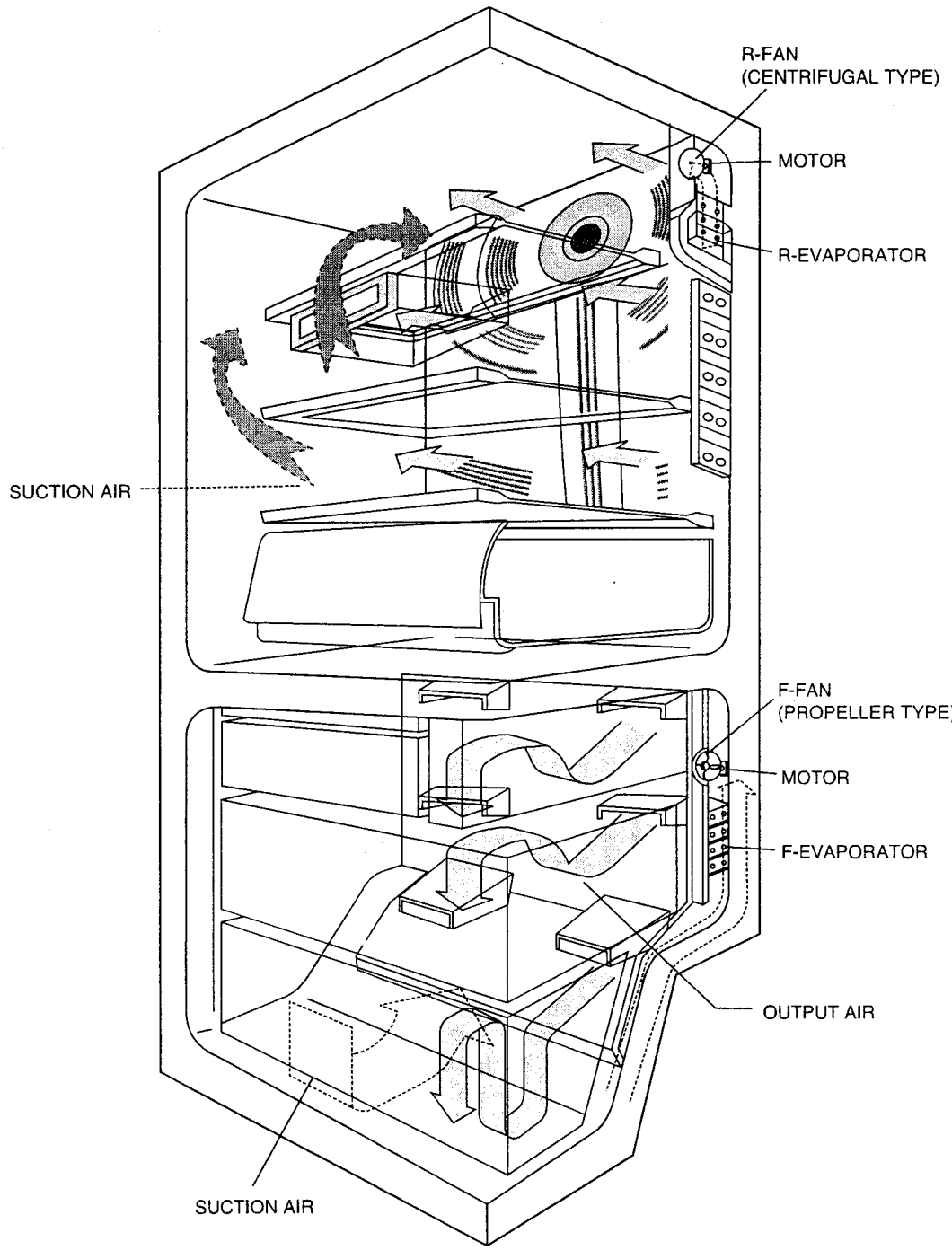

• Top tray disassembly
Pull it forward.
Take out food stuffs and pull it out by following the arrow.
Take out the water bottle with the bottom lever pressed.
• Tray disassembly
Pull it out by following the arrow.
• Ice compartment
• Vegetable compartment
• Freezing compartment

5-3. Circulation of Refrigerant (H.M CYCLE)

Compressor → Sub condenser → Cluster pipe → Hot pipe → Dryer → Capillary tube → R-Evaporator → F-Evaporator → Accumulator → Suction pipe → Compressor

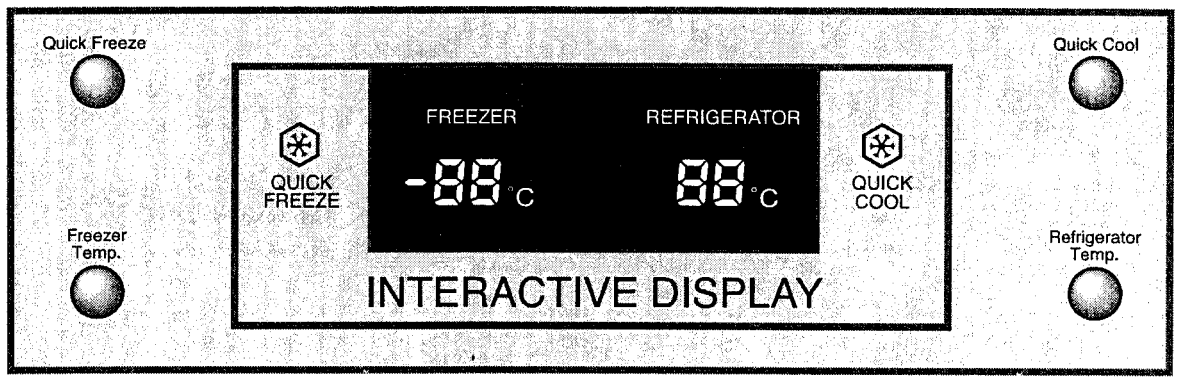


5-4. Cool Air Circulation



5-5. Temperature Control and Other Capacity Explanation

1. Display design



2. Temperature control function

1) Temperature selection of freezer compartment

❊ After the initial key selection, it displays the notch which is presently set up, then within 5 seconds re-memorize the key after 1-2) points mentioned below. If there is no input of the key, it moves back to the previous temperature display.

1-1) From -14˚C ~ -25˚C, each one key is selected in 1˚C interval.

1-2) Selection key operation for Freezer is set up orderly.

1-3) Actual temperature is indicated during both Power-On and electrical failure.

1-4) Standard temperature of each stage is as follows.(standard for 1/3 height)

Stage	1	2	3	4	5	6	7	8	9	10	11	12
Temperature	-14˚C	-15˚C	-16˚C	-17˚C	-18˚C	-19˚C	-20˚C	-21˚C	-22˚C	-23˚C	-24˚C	-25˚C

1-5) After key input, seven-segment indication changes immediately but actual function operates after 10seconds.

2) Temperature selection of refrigerator compartment

2-1) From 7˚C ~ 1˚C, each one key is selected in 1˚C interval.

2-2) After the initial key selection, the former selected temperature is displayed, and within 5seconds temperature selection alters as in 2-3), and when final key input is done, the final key input temperature converse into a set point after 10 seconds.

2-3) Set up is established orderly according to operation of selection button.

2-4) Actual temperature is indicated during both Power-On and electrical failure.

2-5) Standard temperature of each stage is as follows.(standard for 1/3 height)

Stage	1	2	3	4	5	6	7
Temperature	7˚C	6˚C	5˚C	4˚C	3˚C	2˚C	1˚C

2-6) After key input seven-segment indication changes immediately but actual function operates after 10seconds.

3) Quick freeze

3-1) Press the on/off buttons of Quick Freeze so that the lamp of Quick Freeze is light up and off and then it operates it's function automatically.

3-2) It does not indicate from initial Power on.

Change of light indication	Initial Power On	Pressed once time	Pressed second time	Remark
	Off →	Quick Freeze On →	Off →	

a) When Quick Freeze is selected, LED indication will immediately change but actual operation operates after 10 seconds. (COMP and FAN operates continuously for 2 hours and 30 minutes and it switches off automatically.)

b) When Quick Freeze is selected, it will operate unconditionally without considering the temperature of freezer compartment.

c) During the operation, the temperature of refrigerator compartment is controlled automatically by the selected temperature.

d) Temperature display of freezer displays actual temperature.

4) Quick cool.

4-1) Press the on/off buttons of Quick Cool so that the lamp of Quick Cool is light up and off then it operates its function automatically.

4-2) It does not indicate from initial Power on.

Change of light indication	Inition Power On	Pressed Once time	Pressed second time	Remark
	Off →	Quick Cool On →	Off →	

a) When Quick Cool is selected, LED indication will immediately change but actual operation operates after 10 seconds.

b) When Quick Cool is selected, COMP and R-Fan are operate until the temperature of refrigerator compartment reached -2°C but the maximum operation time of Quick Cool is 2 hours and 30 minutes. So that, it switches off automatically after 2 hours and 30 minutes.

c) During the operation, the temperature of freezer compartment is controlled automatically by the selected temperature.

d) Temperature display of refrigerator displays actual temperature.

※ If you press Quick Freeze and Quick Cool button concurrently, each function operates independently.

Reference

If you choose Quick Freeze or Quick Cool when freezer temperature is more than -10°C and refrigerator temperature is above +10°C just as the initial Power On Condition, it operates differently from what is mentioned above, and this is an exceptional case.

5) Sabbath function
5-1) It will turn to sabbath function if you press freezer and refrigerator temperatune button together for 5 seconds.
5-2) When turned to sabbath function, all of the front display of LED turn off.
5-3) The light will not switch on even when the door is opened, and if it was switched on then it will switch off.
5-4) To cancel the operation, you have to press freezer and refrigerator temperature button together again for 5 seconds.
※ This function is used only in special area.

3. Buzzer alarm function
1) Touch button type (ding-dong sound)
1-1) there is "ding-dong" sound to confirm input periodically for each one second for button operation in each control panel.
1-2) key recognition is within 0.2 sec and "ding" sound beeps in continuous key recognition.
1-3) key recognition sound will first activate in other information.

2. Alarm when door is open
2-1)Alarm melody will run if door of freezer or refrigerator is open for 2 minutes or more.
2-2) If door continue to remain open alarm will run periodically.
2-3) Alarm will immediately stop when door is closed.

3. Forced running alarm and forced defrost alarm (beep sound).
3-1) If forced running, or defrost is chosen, there is a beep sound.
3-2) Once you press forced running test button, it will beep until you choose cancellation or it cancel automatically (0.25sec ON/0.75sec OFF)
3-3) It will beep even during defrost is complete (include paused time) or until cancel button is pressed.
3-4) During forced running alarm runs 0.1sec on and 1sec off, and during forced defrost alarm runs as well 0.5sec on and 0.5sec off.

4. Defrost function
1) Once power is on and COMP is ON for 4 hours, both refrigerator and freezer starts to defrost at the same time.
2) When the defrost time is reached, F-Fan and COMP runs pre-cooling for 20 minutes and starts heating activity then the pause time is operated about 8 ~12 minutes(10±2minutes).
3) Actual defrost period is from minimum 6 hours up to maximum 11 hours, and freezer compartment defrost period is from min. 12 hours up to max. 22 hours instantaneously (COMP ON for additional period).
4) The decision of defrost period is maded by the ambient temperature and the count of door open and the length of door open time.
5) Defrost periods memorize these information at MICOM as a case per hour. Therefore, case of defrost period distinguishes per hour.
6) Influences of count and length of door open for time distinguisher get checked from the door switchs of refrigerator compartment and freezer compartment.
7) If refrigerator compartment temperature is over trset_on+6°C (at ambient temp. is over 21°C) or trset_on+2°C (at ambient temp is over 33°C), COMP is runned by refrigerator compartrment temperature. In this case, the defrost heater of refrigerator compartment starts after 2 hours running of COMP.
8) After 7) is proceeded, the concurrent defrosting of freezer and refrigerator start after 4 hours 4 hours running of COMP.
9) If defrost operation is reached during quick freeze operation, quick freezer operation is finished first and then defrost operation is proceeded.

5. Test function

※ Test function is for the test of PCB, product, official inspection and ability of SVC.

※ When s/w test is chosen and tested the product, you switch off and on again then let it run a self-test.

1) Function of forced running.

1-1) If you choose PCB button once, COMP will automatically start.

1-2) When forced running is chosen, freezer will show "FF" and "1" in refrigerator automatically. when this option is selected and 1 minute is past, temperature memorized will not change even if you select defrost or cancel test activation (maintains F:-25˚C and R:1˚C).

1-3) Forced running will activate only for 24 hours in full-down operation. Freezer and refrigerator will automatically activate.

1-4) To cancel forced running power is off and on again or select test cancel mode.

1-5) During forced running alarm (0.25sec ON/ 0.75 sec OFF) runs until it is completed. The alarm will continue without alarm key selection.

1-6) When forced running is selected, quick freeze operation does not activate.

2) Forced defrost function

2-1) When you press test button once more during forced running refrigerator compartment activates defrost.(R-defrost only)

2-2) If you press button once more, freezer defrost will start at the same time with refrigerator.

2-3) If forced defrost function is selected, forced running will automatically cancel. And after forced defrost is completed, it will proceed normal operation.

3) Test cancel mode

3-1) When you press test button once more during forced defrost in freezer and refrigerator, it proceeds normal operation.

3-2) Alarm will stop during test cancel mode.

6. Function of initial Power ON

1) When power ON, refrigerator proceed initial self-test and, if normal, it indicate LED in all operation panel for 2 seconds.

2) When proceeding self-test and if temperature sensor finds fault sensor, LED displays the relatecl LED(see table 1.) for periods of 0.5 sec of related LED.

3) Switch on all LED for 2 sec. Initial display of freezer and refriger show actual temperature.

4) Keep condition of R-defrost heater and F-defrost heater for 3 sec for interval of 0.5 sec.

5) If F and R- defrost is finished at initial condition, COMP, F-fan and R-fan activates intervals with 0.5 sec without inner temperature condition.

7. Power failure compensating function

1) function of notch save.

1-1) When you press quick freeze, quick cool, freezer, refrigerator button, micom save present operating and display condition. Once the power is re-instated, the appliance will continue to operate at the most recent temperature setting (except test mode.)

1-2) 1-1) Activity proceeds when F-evap. and R-evap. Temperature is below 10˚C added together at initial power ON, it will activate, and if its more than 10˚C it goes back to initial mode activity. Quick freeze, quick cool and Sabbath function get not selected.

1-3) If power gets off during quick freeze, quick cool or sabbath function and then the power is re-instated, the appliance will proceed quick freeze or quick cool function again at least one of F-evap. or R-evap. temperature is below 10˚C.

※ Exhibition mode

1. When you press quick freeze button and freezer temp. button together the operation changes into exhibition mode.
2. In exhibition mode, compressor is immediately off and defrost do not activate.
3. If you press quick freeze button and freezer temp. button together for 5 sec exhibition mode cancel out and bact to nomal operation.

8. Self-test function
   1) Define of the fault temperature sensor : temperature of the sensor is over between -50°C (4.5volt) ~ +50°C(0.5volt)
      1-1) Self-test fuction due to power ON.
      a) When a power is ON, it internal MICOM will decide faulty in temperature within 1 sec.
      b) If faulty sensor is found, the "related display LED" switches on and off for 0.5 sec intervals. And it will not beep (refer to self-test faulty indication table).
      c) At the LED situation is the faulty sensor display, self-test function key (press quick freezer and quick cool button for 5 sec) is the control of normal temperature is delayed.
      d) Fixing default sensor when there is an error, or press quick freeze and quick cool button for 5 sec., it automatically cancel and activate normally.
   2) Self-test function during normal activation
      a) During normal activation, if you press quick freeze and quick cool key together for 3 sec. temperature selection display of all ON/ OFF show for 2 sec by 0.5 intervals. Including this 2 sec, press quick freeze and quick cool button together for 5 sec then it select self-test function.
      b) If there is ding-dong sound it change into self-test function. If you press refrigerator temp. selection button during 2 sec display toggle, it proceeds as the display function of the presently operating parts.
      c) If there is an error of the sensor, display of the faulty sensor continue for 30 sec then activate normally (ding-dong alarm activates).
      d) Button selecting is not selected during self-test proceeding.

Table 1. Display table of self diagnosis.

No	Item	Display LED	Symptom	Remark
1	R-sensor	Refrigerator 5	• Open faulty • Short faulty	•Suspected to be below -50˚C •Suspected to be over +50˚C
2	R-area defroster sensor	Refrigerator d	• Open faulty • Short faulty	•Suspected to be below -50˚C •Suspected to be over +50˚C
3	Outer sensor	FreezerE 5	• Open faulty • Short faulty	•Suspected to be below -50˚C •Suspected to be over +50˚C
4	F-sensor	FreezerF 5	• Open faulty • Short faulty	•Suspected to be below -50˚C •Suspected to be over +50˚C
5	F-area defroster sensor	Freezerd 5	• Open faulty • Short faulty	•Suspected to be below -50˚C •Suspected to be over +50˚C

9. Display function of the presently operating parts.
   1) If you press quick freeze and quick cool button together for 3 sec during normal operation, LED display refrigerator and freezer temperature will show ON/OFF for 2 sec at interval of 0.5 sec

2) At this moment if you take off quick freeze and quick cool button and press refrigerator temp. button (ding-dong sound), it change into the display of the presently operating parts.
3) This display condition is unrelated to actual operation and it is an reference of indication that MICOM commanded operating order).

Table 2. Display table of the presently operating parts.

No	Content	Display LED	Operation	Remark
1	R-fan	1 st letter "a" led in refrigerator	Include R-fan activation	Ref. 6.button scan and display circuitry (see page 21)
2	R-defrost heater	1 st letter "c" led in refrigerator	Defrost heater activation	
3	Initial start mode	1 st letter "d" led in refrigerator	Initial power is switched ON	
4	Over load mode	1 st letter "e" led in refrigerator	Outer temperature is over 35°C	
5	Low temp.mode	1 st letter "f" led in refrigerator	Outer temperature is below 20°C	
6	Exhibition mode	1 st letter "g" led in refrigerator	Exhibition mode is operated together	
7	Comp	1 st letter "a" led in freezer	Led ON when COMP activation is included	
8	F-fan	1 st letter "b" led in freezer	Led ON F-fan activation is included	
9	F-defrost heater	1 st letter "d" led in freezer	Led ON when F-heater activation is included	
10	F-Lamp	1 st letter "a" led in freezer	Led ON when F-lamp activation is included	
11	R-Lamp	1 st letter "b" led in freezer	Led ON when R-lamp activation is included	
12	Normal mode	1 st letter "e", "f" led off in refrigerator	Out temperature is about 21°C~34°C	

10. Actual temperature and selected temperature in display function
1) Initial power ON
1-1) When initial power On is set, it reads both inner temperature of freezer and refrigerator. Display range of freezer is -35°C~+30°C and refrigerator -9°C~+9°C.
1-2) After this, if freezer inner temperature of a trset_off+1°C above is recognized at least once, LED display of freezer will change into a set-up temperature. And if refrigerator inner temperature of trset_ off +3.5°C above is recognized at least once, LED display of refrigerator will change into a set-up temperatures. After all this, if freezer inner temperature is above 0°C and refrigerator inner temperature above +15°C it will proceed display blinking. But blinking operation only starts 10 minutes after it senses its problem with inner temperature.
1-3) During the actual temp. dispaly condition, you choose quick freeze or quick cool function the LED display will display actual temperature.
2) Stability in inner temperature
2-1) After selected temp. is reached, freezer and refrigerator display the selected temp.
a) If freezer inner temperature is above 0°C for 10 minute, the display of the selected temp. will blink.
b) If refrigerator inner temperature is above 15°C for 10 minute, the display of the selected temp. will blink.
c) When quick freeze is chosen, only freezer display will display actual temperature and the actual temperature displays up to -35°C.

3) Door open
when door is open, the related display shows an actual temperature.
3-1) Display range of freezer is -35°C ~ 30°C and refrigerator is -9°C~9°C.
3-2) If freezer inner temperature is above 0°C for 10 minute, the display of the selected temp. will blink.
3-3) If refrigerator inner temperature is above 15°C for 10 minute, the display of the selected temp. will blink.
3-4) When door is open, 1°C will increase after delay time from the display before door opens. When door close, 1°C will decrease after delay time if there is a change in inner temperature. Temperature will reach up to presently selected notch.

4) Defrost Display function
4-1) If defrost starts both freezer and refrigerator display the selected temperature. So it will not blink for 2 hours even if it sensed faulty in inner temperature, after 2 hours it will decide to blink or not.

Reference

State of COMP cooling fan according to the ambient temperature (When COMP. is re-started)
- always OFF COMP cooling fan when ambient temperature is below 5°C.
- COMP cooling fan always switch ON after 9 minute when ambient temperature is 6°C~10°C.
- COMP cooling fan always switch ON after 6 minute when ambient temperature is 11°C~15°C.
- COMP cooling fan always switch ON after 3 minute when ambient temperature is 16°C~21°C.
- COMP cooling fan always switch ON when ambient temperature is over 21°C.

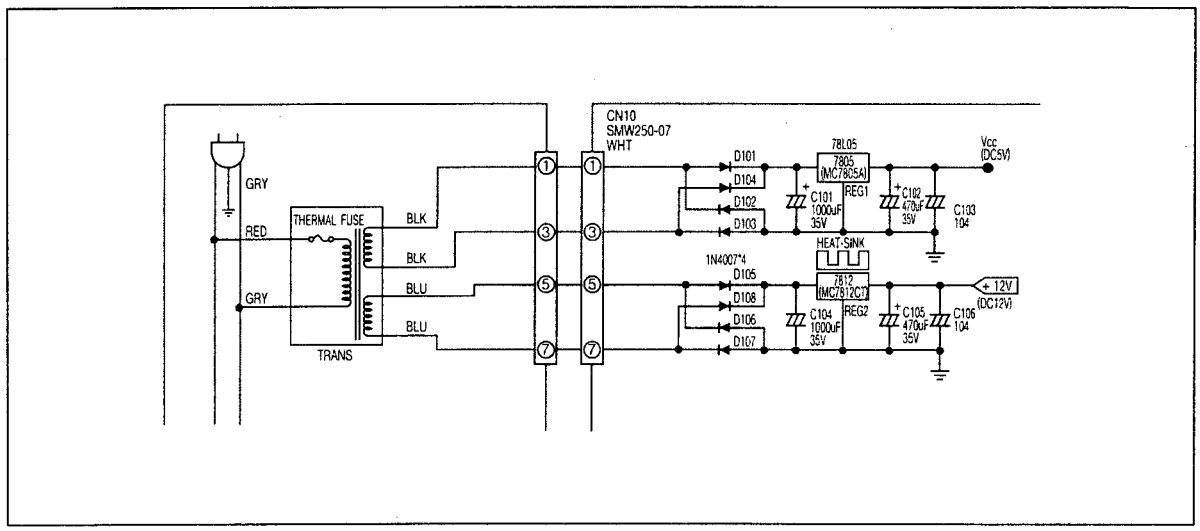
(PCB Part List)

NO	CODE NO	ITEM	SPEC	Q'ty	Remark
1	DA41-00099A	PBA MAIN	W2 PJT	1	
2	DA41-00099B	PBA MAIN	W2 PJT	1	AHAM OPTION
3	DA41-00102A	PBAPANEL	W2 PJT	1	
4	DA26-30111H	DC TRANS	220~240V/50, 60Hz	1	Different according to the source of power
5	DA26-30111F		105V/50,60Hz	1	
6	DA26-30111C		127V/50,60Hz	1	
7	DA32-00006C	F, R DEF SENSOR	PX-41C	1	
8	DA32-00006C	F, R DEF SENSOR	PX-41C	1	
9	DA32-10109H	R SENSOR	PX-41C	1	
10	DA32-10105A	F SENSOR	PX-41C	1	
11	DA41-00013B	INVERTER PCB	220~240V/50,60Hz	1	Different according to the source of power
12	DA41-20160A		127V/50,60Hz	1	
13	DA41-20148A		105~115V/50,60Hz	1	

※ code for temperature might change due to after the progress in development in products

6. Circuit Descriptions

6-1. Power circuit

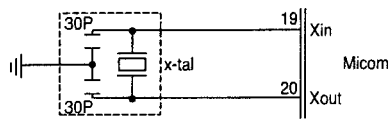


Voltage	Circuit used
+12 (DC 12V)	Relay Operation & LED Display
Vcc (DC 5V)	Power around MICOM & Sensor Detector

1) The input AC voltage of DC-trans secondary registers 8V at CN10 between ①~③. The rectified voltage passed through D101 ~ 104 becomes DC 5V through voltage regulator MC7805(REG1). The power(DC5V) is supplied to the power around micom and sensor detector.

2) The input AC Voltage of DC-trans secondary registers 15V at CN10 between ⑤~⑦. The rectified voltage passed throush D105 ~ D108 becomes DC 12V through voltage regulator MC7812CT (REG2). The power (DC12V) is supplied to the relay operation and LED display.

6-2. Oscillator

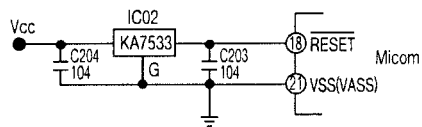


Port	Oscillating Frequency
Xin(#19)	4.00MHz
Xout(#20)	4.00MHz

±0.5% Error

It is designed for clock generation and time calculation for synchronizing transmission and reception on the logic elements inside the MICOM. If the X-TAL specification changes, MICOM may make an error.
(The standard components should be used.)

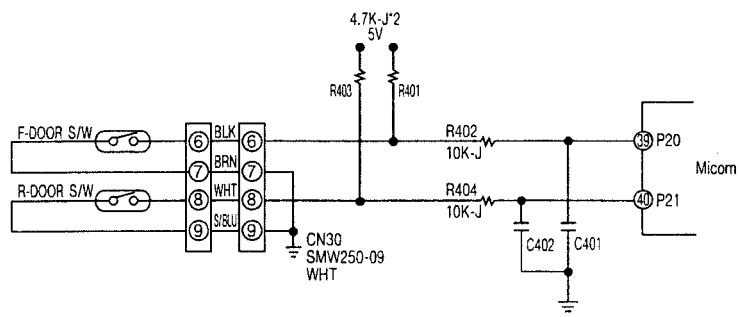
6-3. Reset Circuit



Port	Voltage
Vcc	5V
Reset	5V

When power is supplied to MICOM, reset circuit initializes RAM and other parts on MICOM to initialize all programs. Reset voltage maintains "low" for hundreds of μsec comparing to MICOM Vcc voltage when power is input. It also maintains "high"(5V) during normal operation. But, when Vcc drops to 3.4V-3.7V, reset port becomes "low".

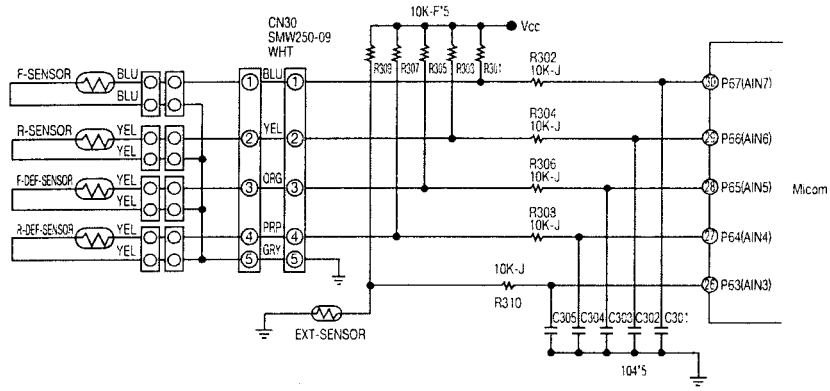
6-4. Door S/W Detector



DOOR	Door Conditions	Door S/W Contact	MICOM PIN NO	Micom Input Voltage
F	CLOSE	OPEN	# 39	"HIGH"
	OPEN	CLOSE		"LOW"
R	CLOSE	OPEN	# 40	"HIGH"
	OPEN	CLOSE		"LOW"

1) If door is open, door S/W contact is closed. Then MICOM receives "low" signal and detects door open then, Relay control circuit receives "HIGH" signal and turn Lamp on.
2) If door is closed, door S/W contact is open. Then MICOM receives "high" signal and detects door close then, Relay control circuit receives "LOW" signal and turn Lamp off.

6-5. Temperature Sensor



(Air Sensor)

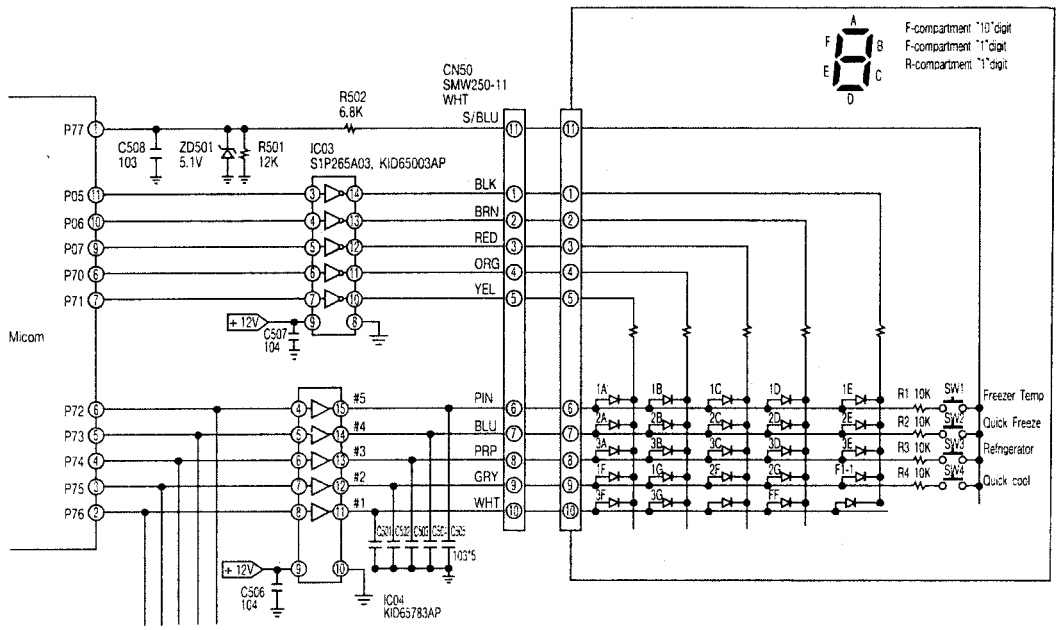
When Sensor is open	When sensor is cut off
MICOM input "HIGH"	MICOM input "LOW"

1) The sensor uses the characteristics of thermistor. If temperature goes higher, resistance goes lower. On the contrary, if temperature goes lower, resistance goes higher.
2) MICOM input voltage is counted by sensor as follows.

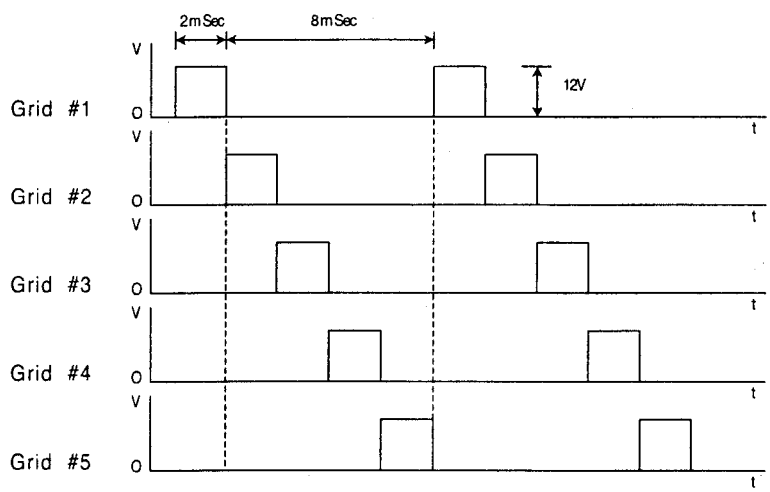
$$V_F = \frac{R_{TH}}{R_{TH} + R_{301}} \times V_{CC}$$ (V_{CC} : 5V, R_{TH} : Sensor reisitance)

3) For the resistance information on temperature and MICOM input voltage, please refer the conversion table. (Page. 41)

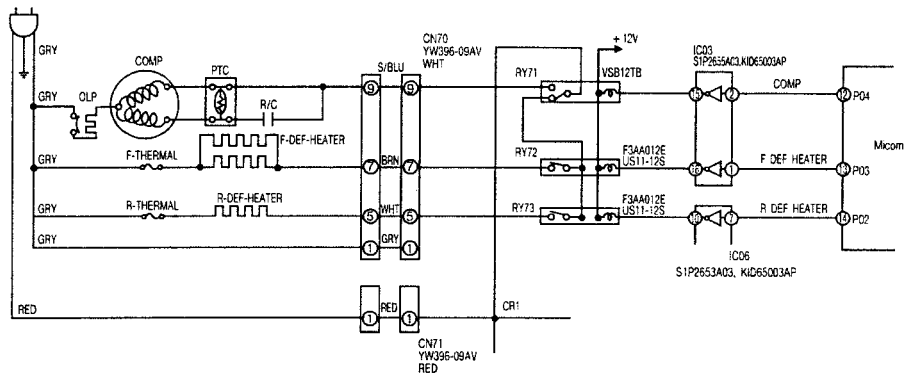
6-6. Button scan and display circuitry



At that time, the peak to peak voltage of square signal registers around 12V. The grid #1 ~#5 waveforms are as follows.



6-7. Load Operation

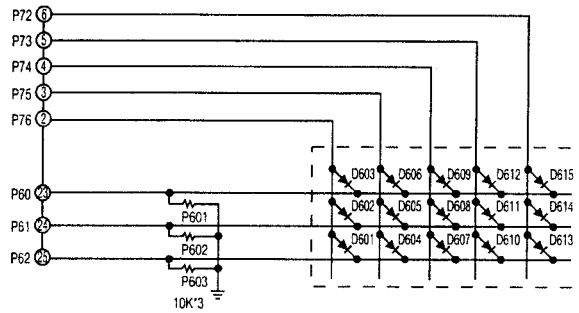


If MICOM outputs "high" signal to driver-IC(KID65003AP/S1P2655A ø 3) according to each load operation conditions, IC turns on and DC 12V flows to ground through the relevant relay coil. Then, core is magnetized by the coil current, and relay contact switches on. When relay contact is on, AC POWER is supplied to the relevant operation load, then which will be activated. If MICOM outputs "low" signal, load operation stops with the relevant relay contact off.

RELAY		Load	Remark
COMP	Defrost Heater		
on	off	Comp Operation	Defrost-Heater Power Off
on	on	Comp off, Defrost-Heater Off	
off	on	Defrost-Heater On	Comp Power Off
off	off	Comp Off, Defrost-Heater Off	

Like the above block diagram, operation of F, R defrost heater is detervminedy according to the operation of relay for COMP. When comp relay is connected to NO terminal, comp operates. However, in case of F, R defrost heater, electricity dose not pass through the heater though relay works, But, if Comp relay is connected to NC terminal, comp does not operate and heater gets electrieity according to operation of F, R defrost relay.

6-8. Other option functions



Temperature and function values are changeable by using main PCB switching diode.

• Note : If possible, do not change because the values have been set in factory. When changing option functions, power should be turned off.
(Only initial power-on allows reading option function)

6-9. Option Table

NOTE

If possible, do not change because the values have been set in factory.
When changing option funcfions, power should be turned off.

1) Freezer Temperature Shift (Unit °C)

SHIFT	D601	D602	D603
Reference	-	-	-
-0.5	-	-	●
-1.0	-	●	-
-2.0	-	●	●
-3.0	●	-	-
+1.0	●	-	●
+2.0	●	●	-
+3.0	●	●	●

2) Refrigerator Temperature Shift (Unit °C)

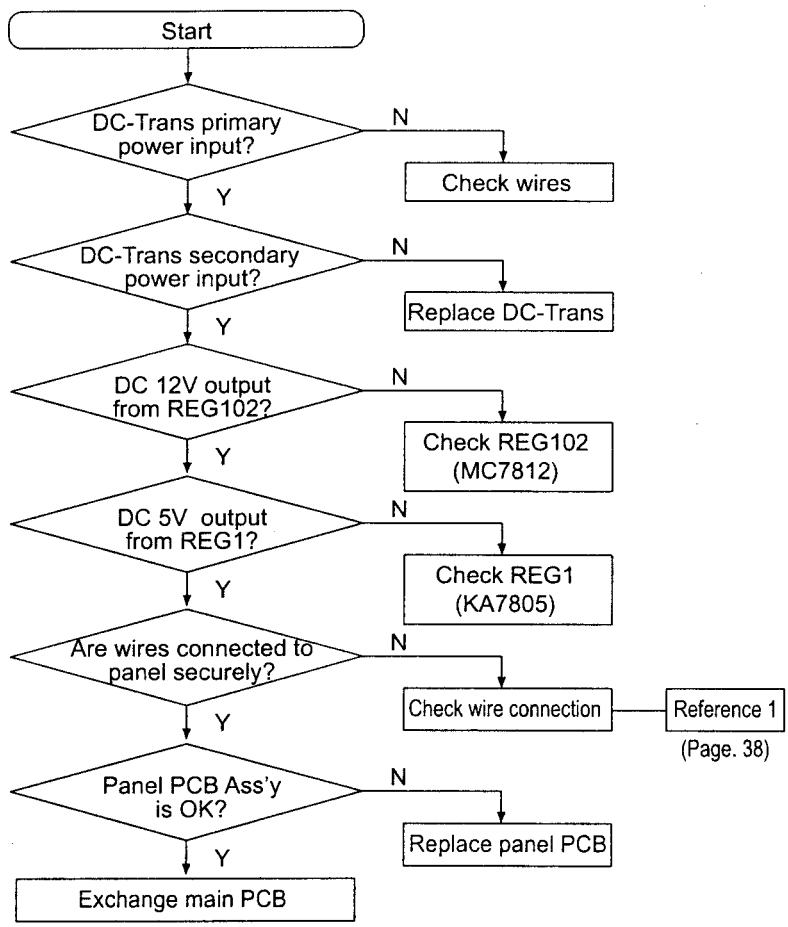
SHIFT	D604	D605	D606
Reference	-	-	-
-0.5	-	-	●
-1.0	-	●	-
-2.0	-	●	●
-3.0	●	-	-
+1.0	●	-	●
+2.0	●	●	-
+3.0	●	●	●

7. Trouble shooting

Precautions

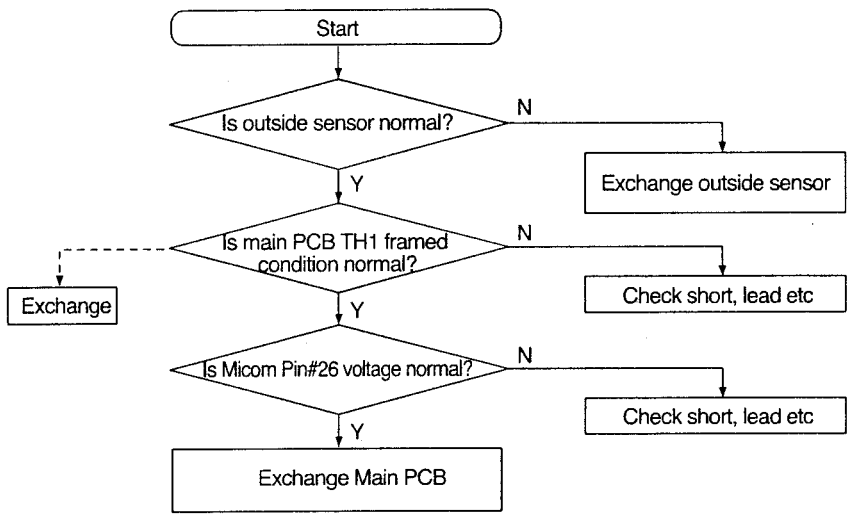
1. Is the power cord well connected to wall outlet?
2. Refer to the reference

1) No power

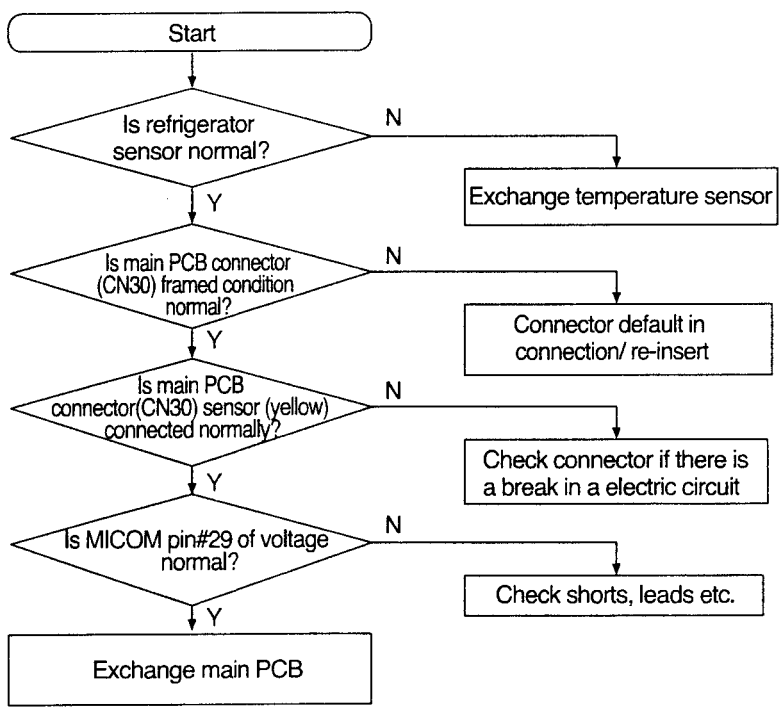


2) Problem with self-test

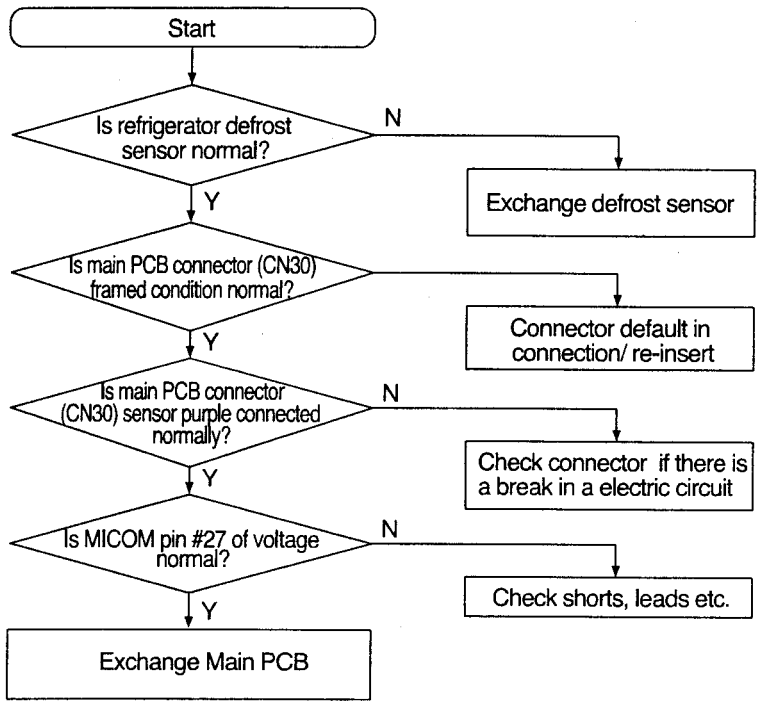
2-1) Problem with outside temperature sensor



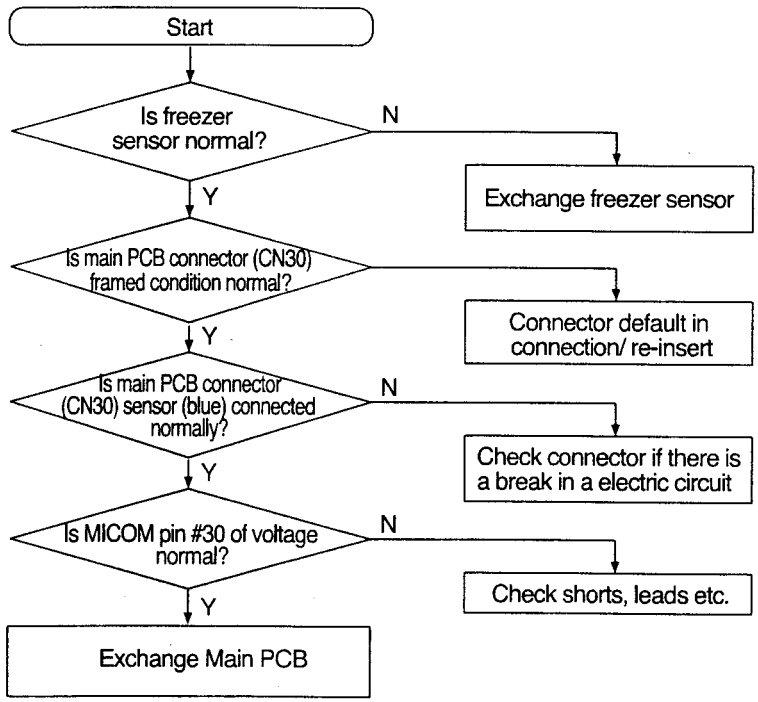
2-2) Problem with refrigerator temperature sensor



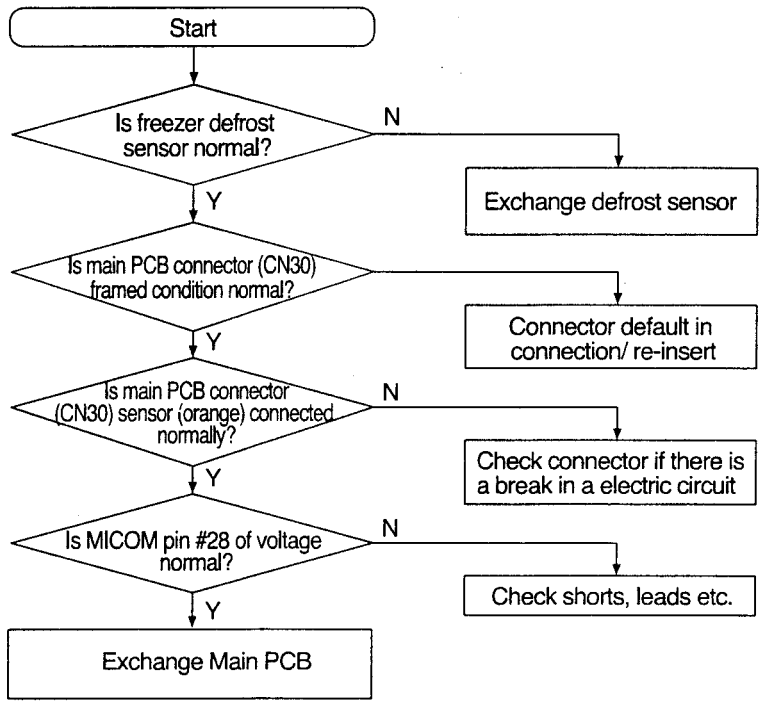
2-3) Problem in refrigerator defrost sensor



2-4) Problem in freezer temperature sensor



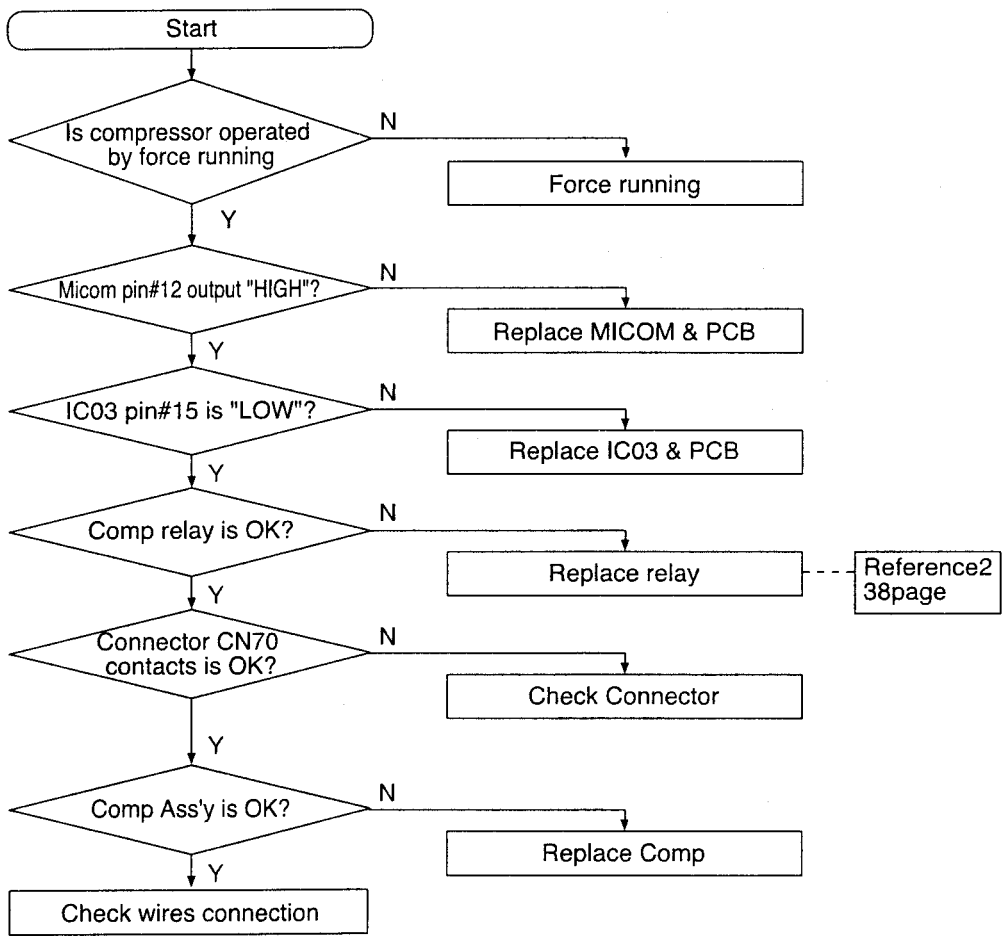
2-5) Problem in freezer defrost sensor



3) Compressor does not run

Reference

1. Compressor does not operate in 5 minutes after compressor OFF.
2. Compressor does not run during defrosting.
3. Compressor does not run because low temperature is detected if freezer and refrigerator sensor is not connected.

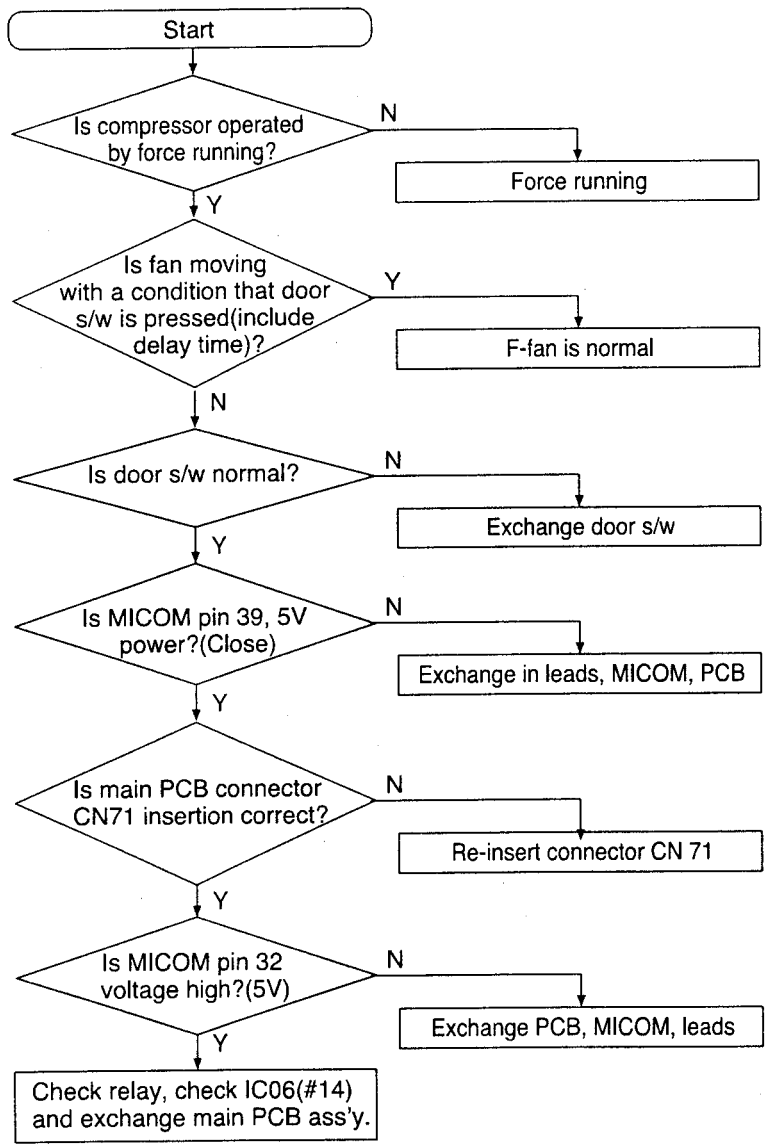


4) When cooling fan do not activate

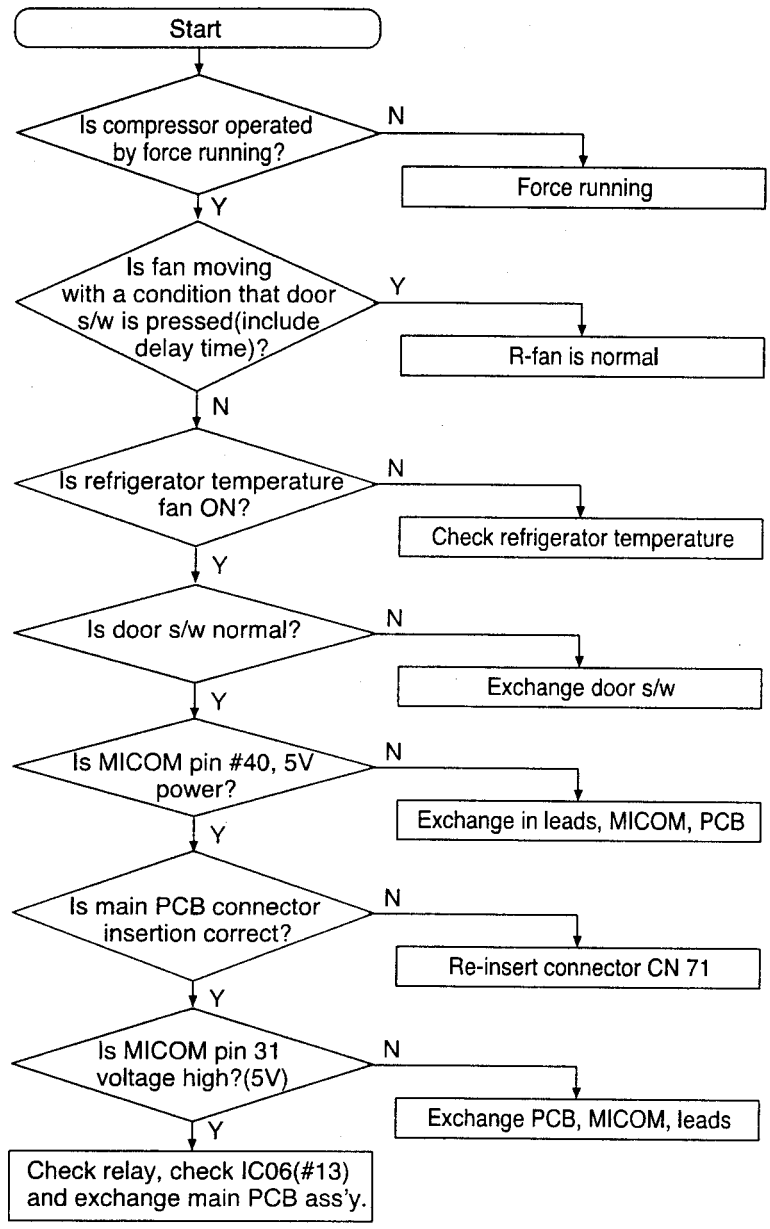
Reference

Check cooling fan when defrost activation is selected.
1. When COMP is OFF both freezer and refrigerator cooling fan plus COMP cooling fan remain OFF.
2 . When COMP is ON, refrigerator fan is not always ON and when refrigerator temperature reached to a set-up temperature fan goes OFF.
3. When both freezer and refrigerator door close from open each fan takes delay time (5sec~ 1 min) and running. (COMP ON as a condition)

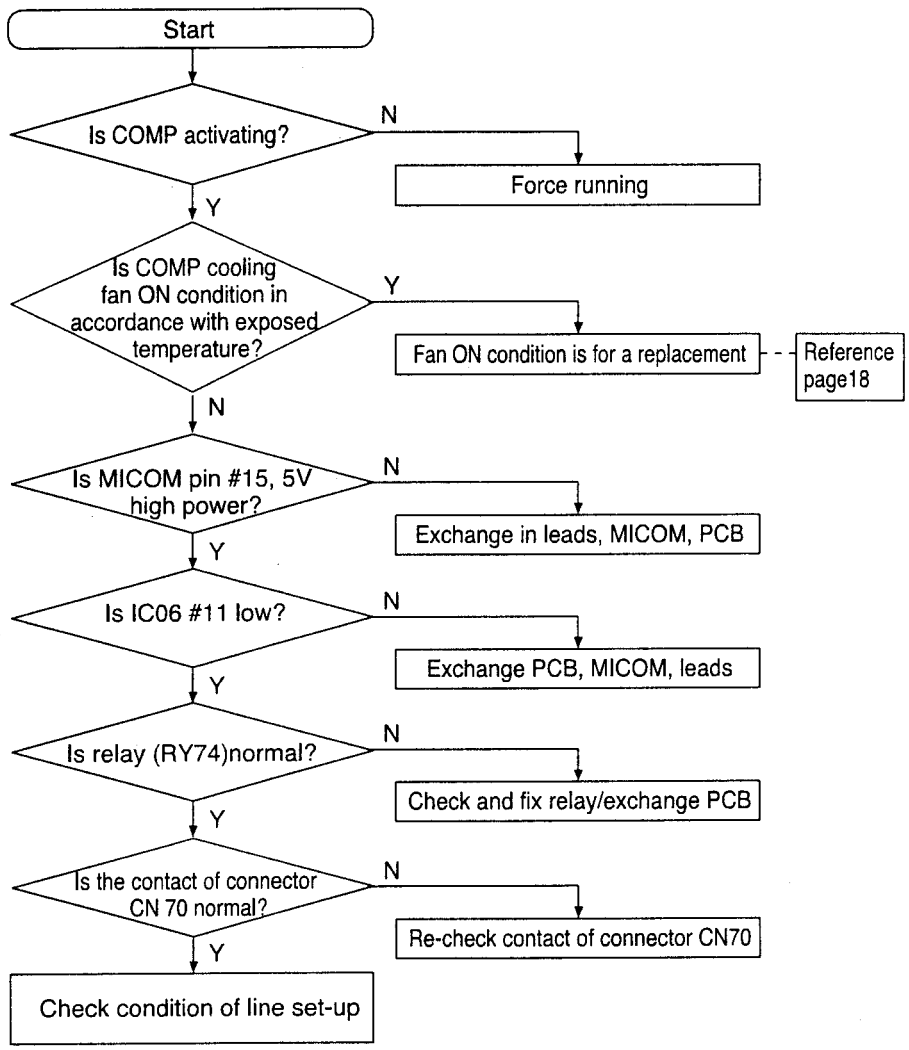
4-1) When freezer fan (f-fan) do not activate



4-2) When refrigerator fan (R-fan) do not activate



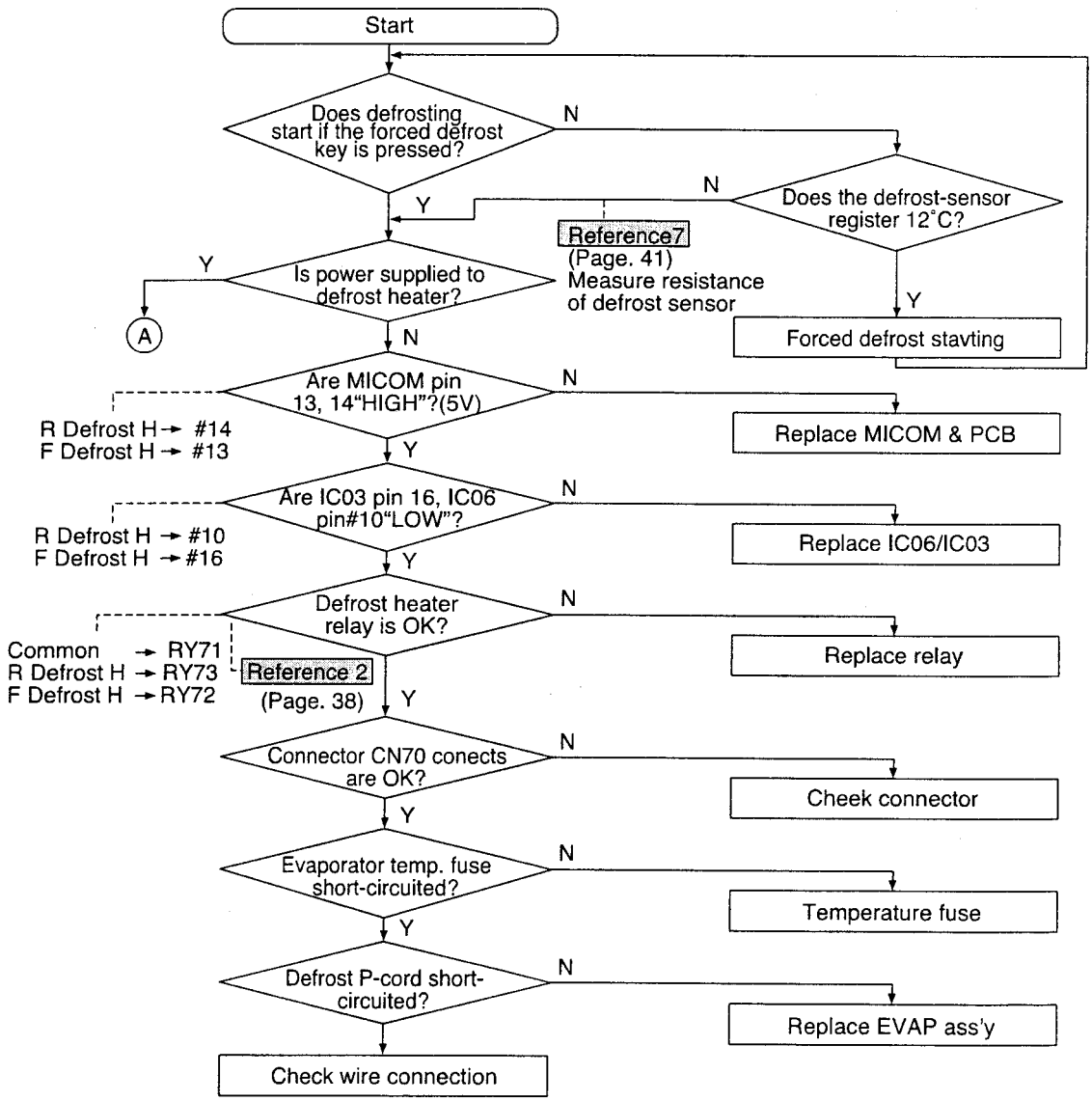
4-3) When COMP cooling fan do not activate

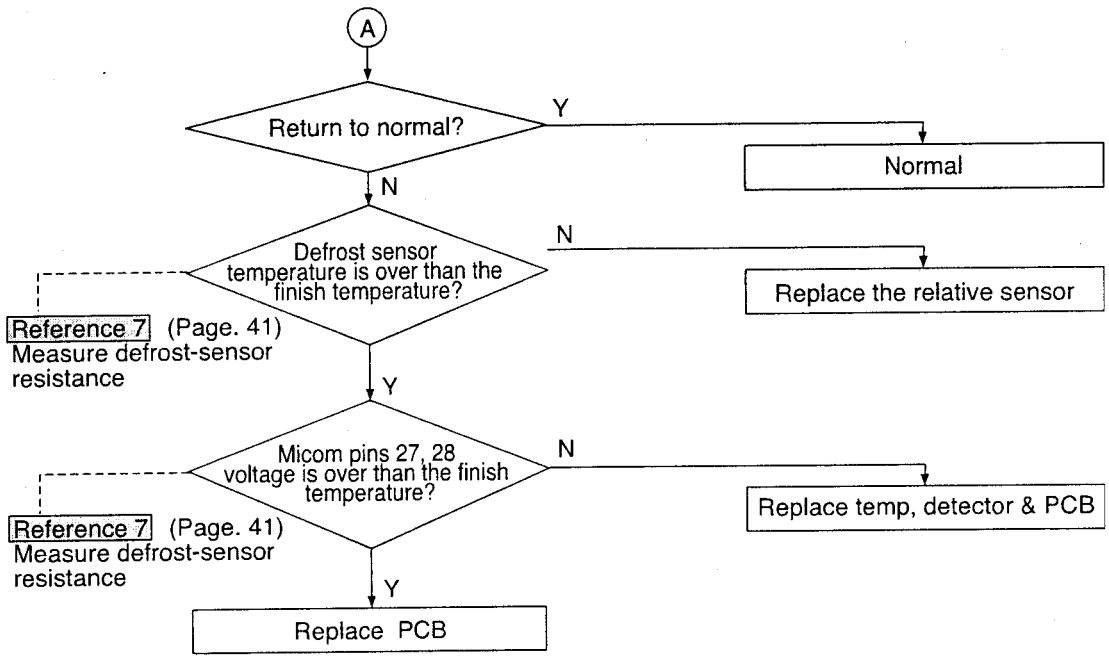


5) No defrosting

Reference

1. Even though both F·R-defrost sensors short-circuit, normal operation continues without defrosting.(Refer to self-diagnosis function)
2. Even though the temperature fuse is off, there is no heating but defrosting natural temperature increase comp off-time takes longer.
3. Even though both F·R-defrost sensor are open, heating does not end and comp-off maintains with temperature fuse short-circuited.(Refer to self-diagnosis function)



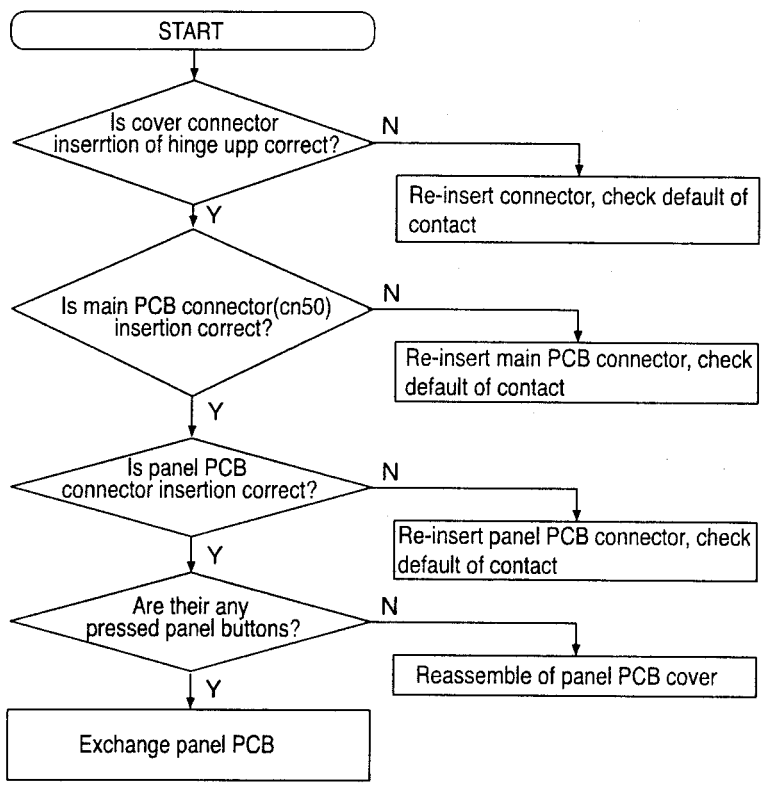

A
Return to normal?
Y
Normal
N
Defrost sensor temperature is over than the finish temperature?
N
Replace the relative sensor
Reference 7 (Page. 41)
Measure defrost-sensor resistance
Y
Micom pins 27, 28 voltage is over than the finish temperature?
N
Replace temp, detector & PCB
Reference 7 (Page. 41)
Measure defrost-sensor resistance
Y
Replace PCB

6) When alarm run continuously

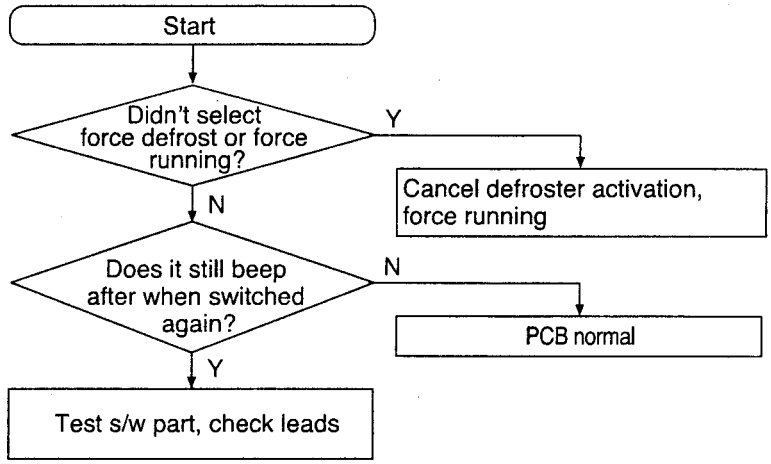
Reference

1. Alarm runs after 2 minute when door is open (melody) and runs in interval in every 2 minutes.
2. If door close is not done properly, MICOM will indicate that the door is open then alarm rings. If it recognize door open over 10 minutes it switch OFF inner lamp goes OFF. Lamp will not go ON in this situation even if door opens.

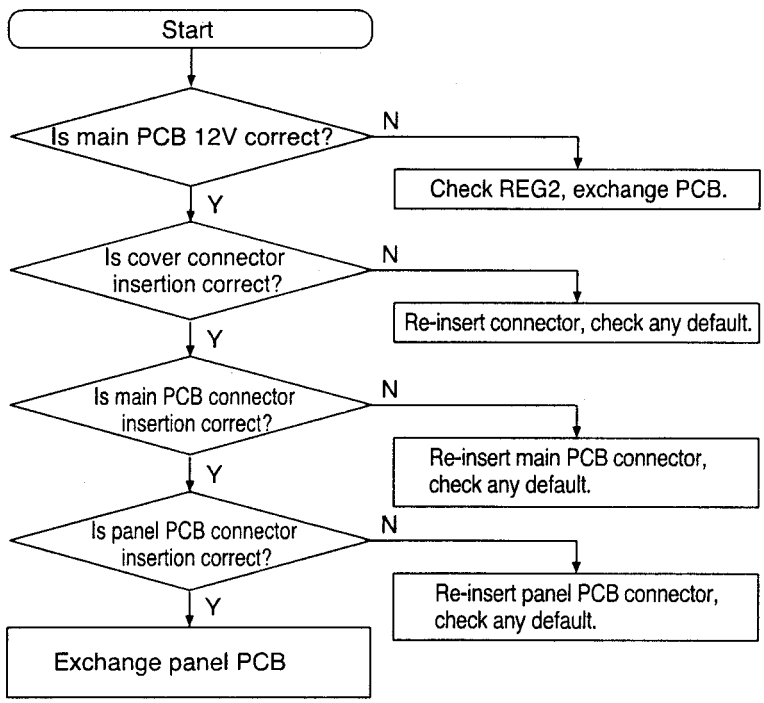
6-1) If melody alarm runs continuously



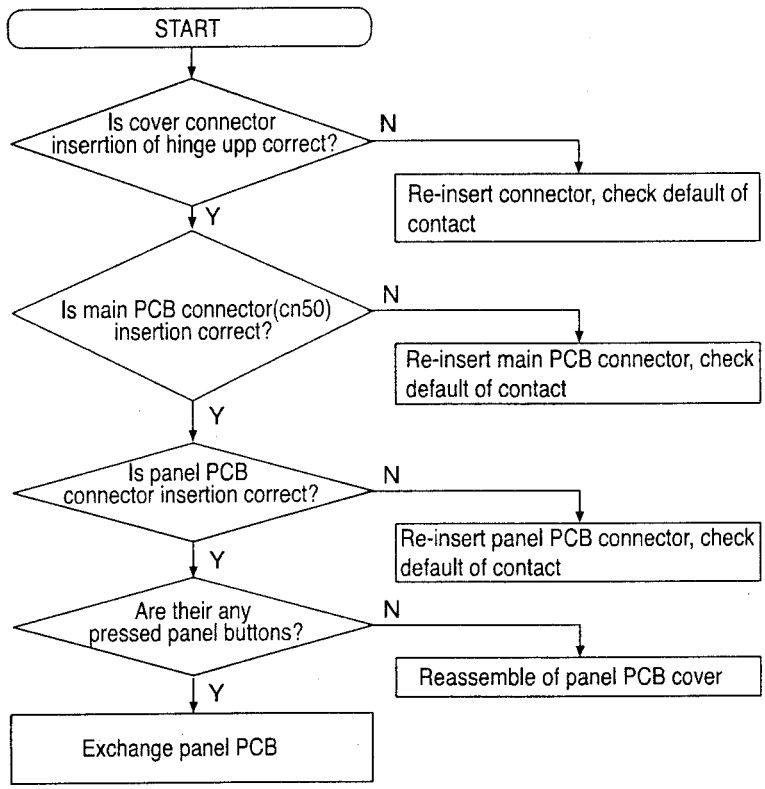
6-2) If Beep sounds continuously



6-3) When original panel PCB do not activate



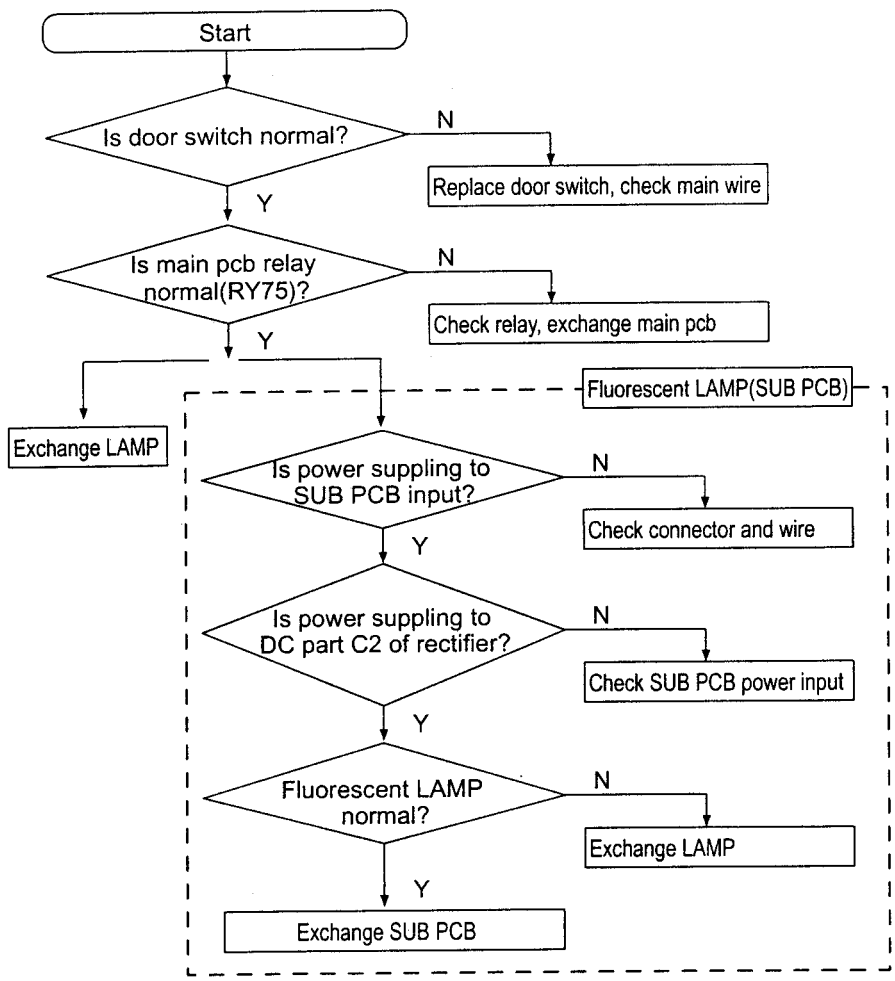
6-4) When buttons of panel PCB is not selected



Reference

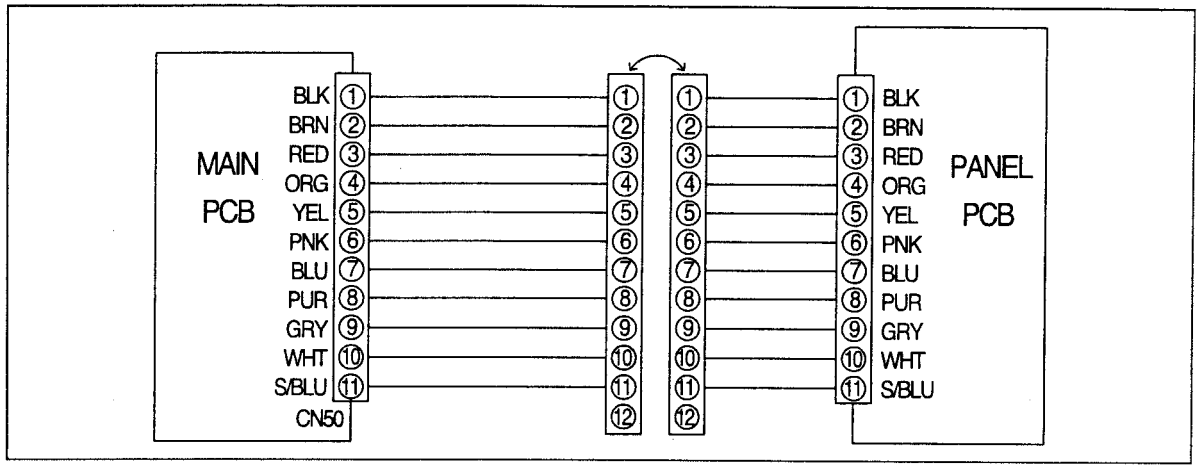
1. Is the power cord well connected to wall outlet?
2. Be careful of high-voltage discharge because high voltage DC power is supplied to SUB-PCB.

6-5) When the light dosen't come on in the refrigerator

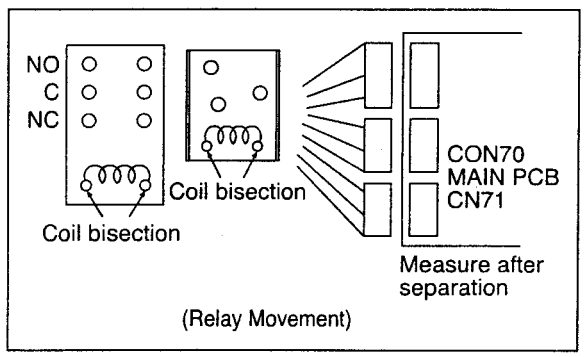


8. Reference

Reference1 The connection of DOOR-CABI



Reference2 Inspection of Relay



* First separate the housing connected to the main PCB CN70, 71 and measure the following items.

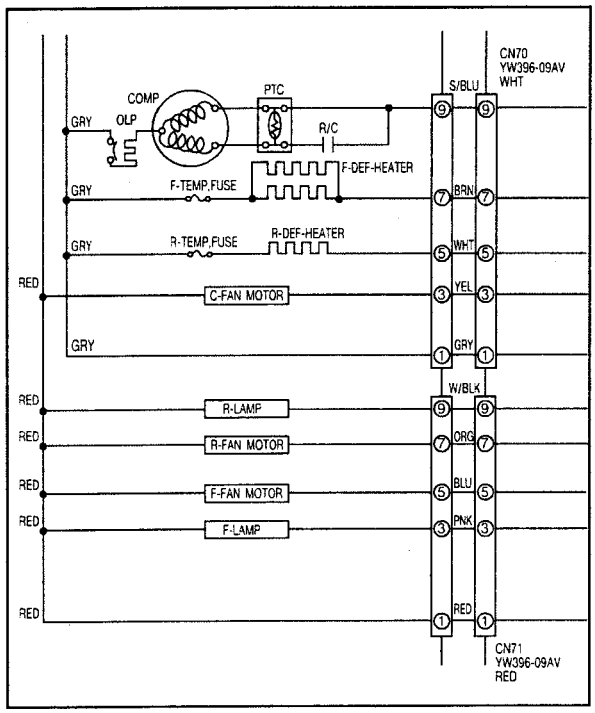
1. Measure the coil bisection of the relay and check whether it works.
2. Measure the apex bisection for open circuit.

Apex category	The voltage of coil bisection	Judging the apex bisection
Apex 3	DC 12V(Operation)	C-NO:SHORT
		C-NC:OPEN
	DC 0V(Standstill)	C-NO:OPEN
		C-NO:SHORT
Apex 2	DC 12V(Operation) DC 0V(Standstill)	SHORT
		OPEN

Note) C → Common, NO → Normal open, NC → Normal close

3. When it operates as above, it is normal and when it does not operate, report the corresponding relay.

Reference3 Check for malfunctioning of the subordinate

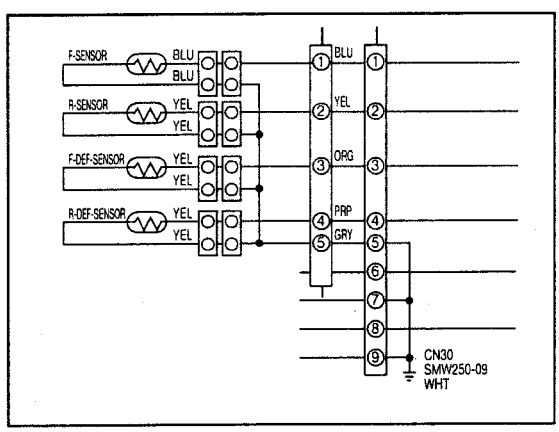


* Cut off the power code, separate the housing from the main PCB CN70,71 and measure the following.

1. Measure resistance between the terminals and check for malfunctioning of L/W.

Subordinate	Measurement terminal	Evaluation of measurement result
R Defrost heater	CN70 ⑤ - ①	
F Defrost heater	CN70 ⑦ - ①	
Comp	CN70 ⑨ - ①	
Comp-circulation fan	CN71 ⑦ - ①	
R-Circulation fan	CN71 ⑤ - ①	
F-Circulation fan	CN70 ③ - ①	
R-Lamp	CN71 ⑨ - ①	
F-Lamp	CN71 ③ - ①	

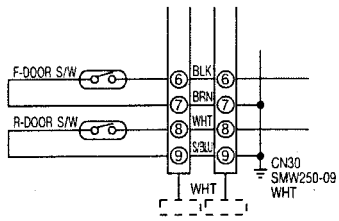
Reference4 Inspection of the sensor



* Separate the housing connected to main PCB CN30.
* Resistance value lowers while temperature rises, because it is a NTC type sensor.

1. R sensor measures resistance of CN30 between ②~⑤.
2. Freezer sensor measures resistance of CN30 between ①~⑤.
3. R-defrost sensor measures resistance of CN30 between ④~⑤.
4. F-defrost sensor measures resistance CN30 between ③~⑤.
5. The measurement value above is calculated by comparing the present temperature of the sensor and the temperature table in specification found in the manual.

Reference5 Checking the Door S/W



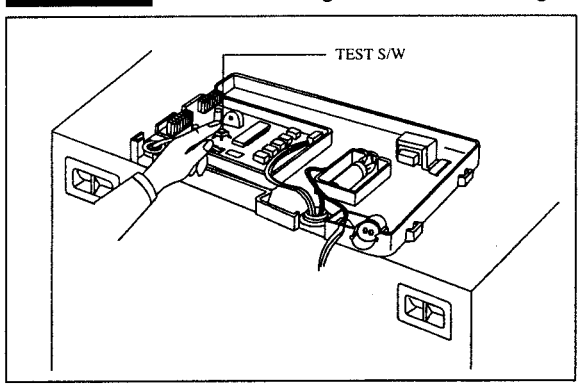
(Refrigerator Bulb)

1. Open the door and check if the freezer bulb turns on.
2. Press the Door S/W and check if the freezer bulb turns off.
3. Close the door of freezer and repeat 1 and 2 for refrigerator.
4. If there is a problem, check bulb and door S/W.
5. Check wire connection.

(Micom signal)

1. Check if CN30 ⑥ and ⑧ is 5V DC after closing the F·R doors.
2. Check if CN30 ⑥ is 0V DC when opening F door.
   Check if CN30 ⑧ is 0V DC when opening R door.
3. If there is problem, check door S/W and wire connection.

Reference6 Forced running & forced defrosting



(Forced running)

* This function is used to turn on the comp and fan immediately regardless of the temperature of freezer.

1. Press the button on the PCB after removing the main PCB cover from the upper part of refrigerator.
2. Buzzer will sound to indicate the forced running.

(Forced defrosting)

* This function is used to turn on the defrosting regardless of defrost time.

1. Press the button during forced running. Then, R-defrosting is performed.
2. If the button is press during R-defrosting, F-defrosting is also performed at the same time.
3. If the button is pressed during R-F defrosting, test mode is released.

Reference7 Sensor resistance and voltage conversion table for temperature
(Sensor pressure voltage 10KΩ – Voltage converted by the F-reference)

* Voltage conversion table depends on H/W structure of MICOM port input voltage.

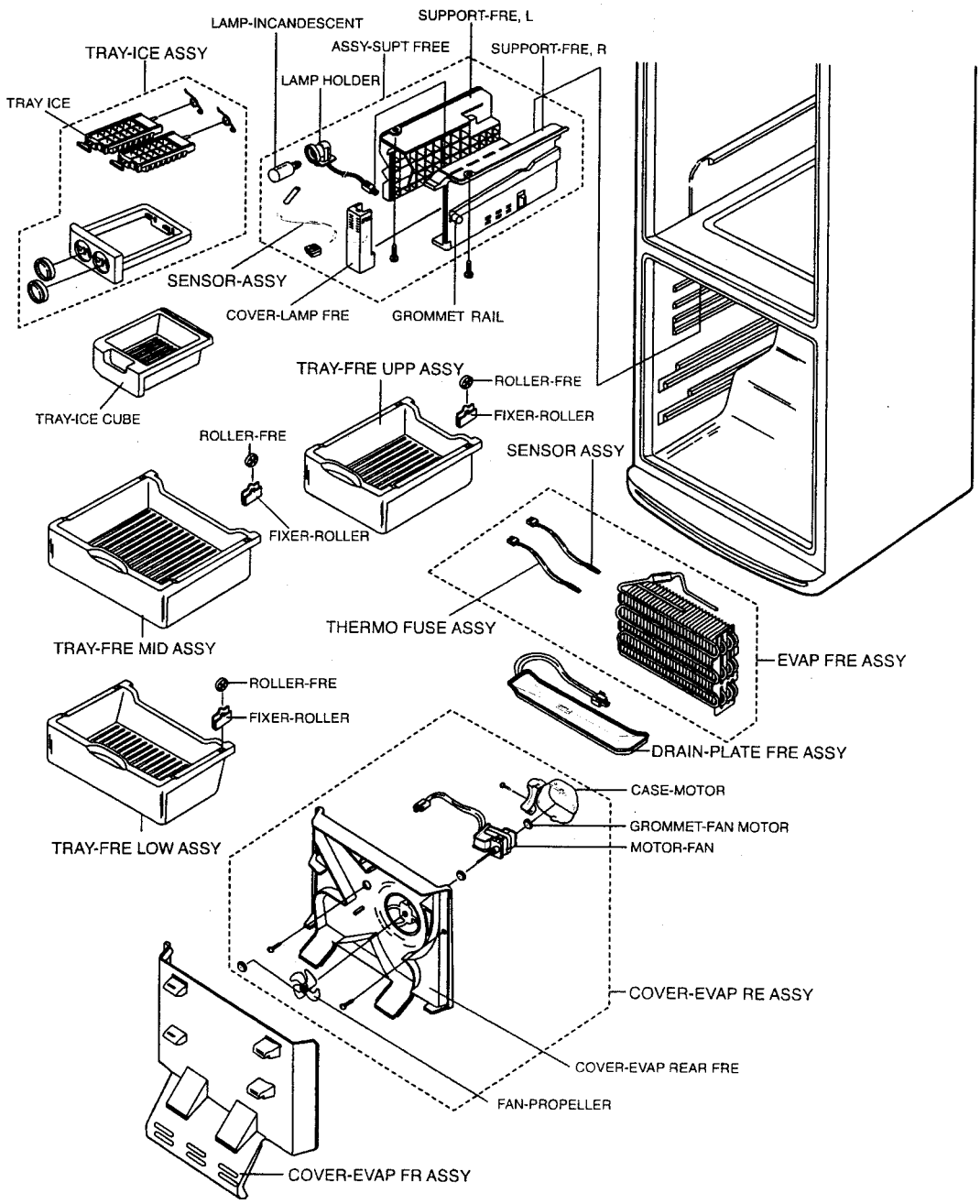
Sensor Short : Micom 0V.
Sensor Open : Micom 5V.

※ Sensor partial pressure resistance 10KΩ

TEMP.	Resistance KΩ±1%	Voltage(V)	TEMP.	Resistance KΩ±1%	Voltage(V)	TEMP.	Resistance KΩ±1%	Voltage(V)
– 35	68.648	4.364	– 13	22.832	3.477	9	9.016	2.37
– 34	65.011	4.333	– 12	21.814	3.428	10	8.673	2.322
– 33	61.595	4.301	– 11	20.848	3.379	11	8.345	2.274
– 32	58.384	4.268	– 10	19.932	3.329	12	8.032	2.227
– 31	55.366	4.235	– 9	19.062	3.279	13	7.732	2.18
– 30	52.526	4.2	– 8	18.237	3.229	14	7.446	2.134
– 29	49.854	4.164	– 7	17.453	3.178	15	7.172	2.088
– 28	47.337	4.127	– 6	16.709	3.127	16	6.910	2.043
– 27	44.967	4.09	– 5	16.001	3.076	17	6.659	1.998
– 26	42.733	4.051	– 4	15.328	3.025	18	6.420	1.954
– 25	40.626	4.012	– 3	14.688	2.974	19	6.190	1.911
– 24	38.640	3.972	– 2	14.080	2.923	20	5.970	1.869
– 23	36.765	3.93	– 1	14.501	2.872	21	5.759	1.786
– 22	34.995	3.888	0	12.949	2.821	22	5.557	1.786
– 21	33.323	3.845	1	12.424	2.77	23	5.363	1.745
– 20	31.743	3.802	2	11.924	2.719	24	5.178	1.705
– 19	30.250	3.757	3	11.447	2.668	25	5.000	1.665
– 18	28.838	3.712	4	10.993	2.618	26	4.829	1.623
– 17	27.502	3.666	5	10.559	2.567	27	4.665	1.59
– 16	26.237	3.62	6	10.146	2.518	28	4.508	1.553
– 15	25.040	3.573	7	9.752	2.468	29	4.357	1.517
– 14	23.906	3.525	8	9.375	2.419	30	4.212	1.481

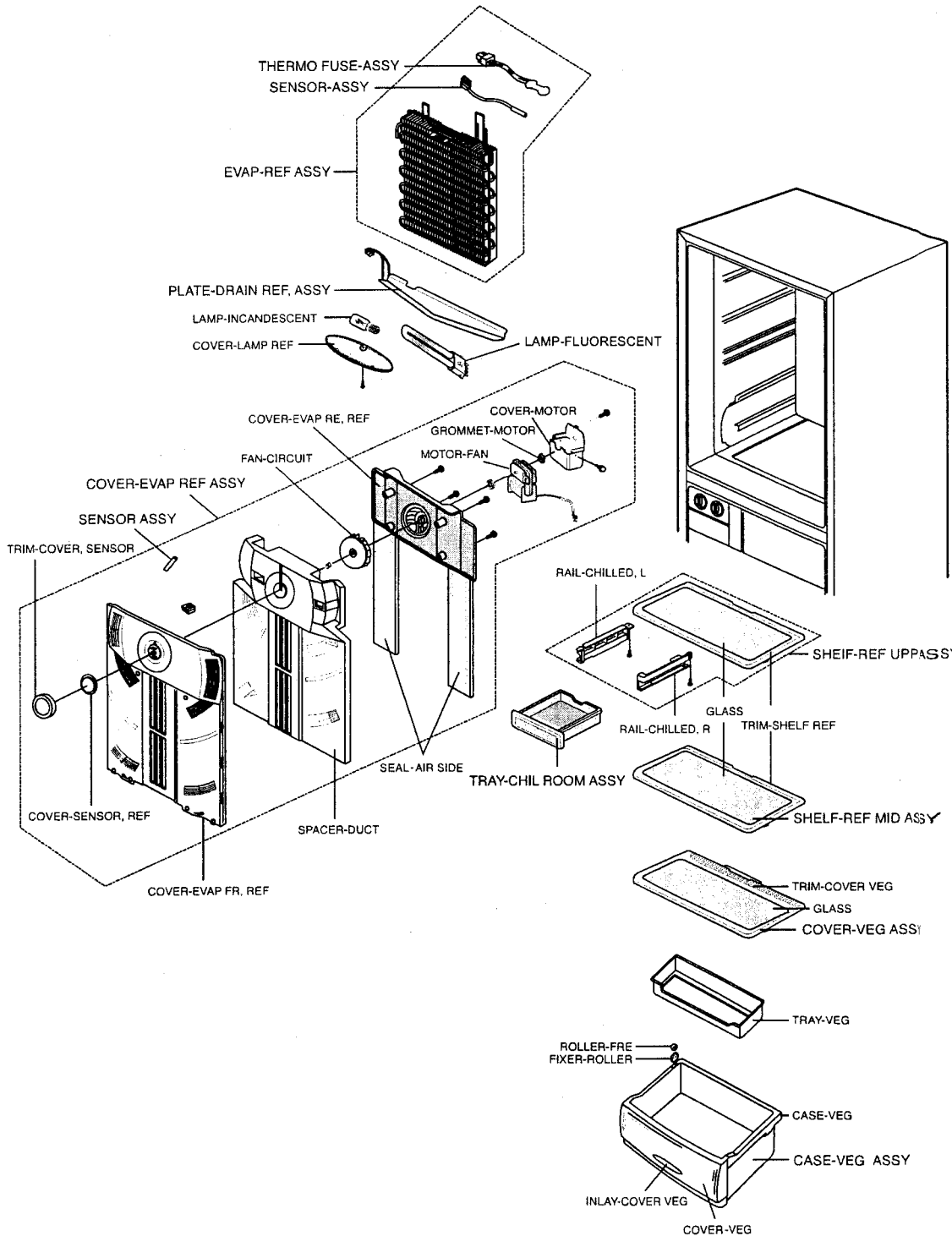
9. Exploed View

9-1. Freezer room



NO	CODE-NO	PART NAME	OPTION				SPEC
			SR-L627	SR-L629	SR-L677	SR-L679	
1	DA67-40203N	TRAY-ICE,ASSY	●	●	●	●	
2	DA67-40182A	TRAY ICE	●	●	●	●	
3	DA63-00946A	TRAY-FRE UPP,ASSY	●	●			
	DA63-00946B	TRAY-FRE UPP,ASSY			●	●	
4	DA63-00947A	TRAY-FRE MID,ASSY	●	●			
	DA63-00947B	TRAY-FRE MID,ASSY			●	●	
5	DA63-00948A	TRAY-FRE LOW,ASSY	●	●			
	DA63-00948B	TRAY-FRE LOW,ASSY			●	●	
6	DA66-10104A	ROLLER FRE	●	●	●	●	
7	DA71-20145A	FIXER ROLLER	●	●	●	●	
8	DA63-00904A	TRAY ICE CUBE	●	●			
	DA63-00922A	TRAY ICE CUBE			●	●	
9	DA97-00181A	COVER EVAP FR(FRE),ASSY	●	●	●	●	
10	DA97-00192C	EVAP-FRE ASSY	●	●	●	●	240V
	DA97-00192D	EVAP-FRE ASSY	●	●	●	●	220V
	DA97-00192E	EVAP-FRE ASSY	●	●	●	●	127V
	DA97-00192F	EVAP-FRE ASSY	●	●	●	●	115V
11	DA47-00095E	ASS'Y-FUSE THERMO(77°C)	●	●	●	●	EVAP FRE,250V
12	DA32-00006C	SENSOR ASSY			●	●	EVAP FRE
13	DA97-00122A	ASSY SUPT-FREE	●	●			230V
	DA97-00122B	ASSY SUPT-FREE			●	●	230V
	DA97-00122C	ASSY SUPT-FREE	●	●			110~130V
	DA97-00122D	ASSY SUPT-FREE			●	●	110~130V
14	DA61-70114B	SUPPORT-FREE,L	●	●	●	●	
15	DA61-70115C	SUPPORT-FREE,R	●	●	●	●	
16	DA63-40006A	GROMMET RAIL	●	●	●	●	ASSY SUPT-FRE
17	DA63-00924A	COVER-LAMP,FRE	●	●			
	DA63-00923A	COVER-LAMP,FRE			●	●	
18	DA47-40112N	LAMP HOLDER	●	●	●	●	
19	DA31-10105A	SENSOR ASSY	●	●	●	●	ASSY SUPT FRE
20	4713-000213	LAMP-INCANDESCENT	●	●	●	●	230V,15W
	4713-001035	LAMP-INCANDESCENT	●	●	●	●	110~130V/15W
21	DA63-00941A	COVER-EVAP RE(FRE),ASSY	●	●	●	●	240V
	DA97-00390A	COVER-EVAP RE(FRE),ASSY	●	●	●	●	220V
	DA97-00390B	COVER-EVAP RE(FRE),ASSY	●	●	●	●	115V
	DA97-00390C	COVER-EVAP RE(FRE),ASSY	●	●	●	●	127V
22	DA63-00903A	COVER-EVAP REAR	●	●	●	●	
23	DA61-00081A	CASE-MOTOR	●	●	●	●	
24	DA31-00019A	FAN-PROPELLER	●	●	●	●	
25	DA31-00002P	MOTOR-FAN	●	●	●	●	240V,50HZ
	DA31-00002W	MOTOR-FAN	●	●	●	●	220V,50,60HZ
	DA31-00002X	MOTOR-FAN	●	●	●	●	127V,60HZ
	DA31-00002V	MOTOR-FAN	●	●	●	●	115V,60HZ
26	DA97-00195B	DRAIN PLATE FRE ASSY	●	●	●	●	240V/52W
	DA97-00195C	DRAIN PLATE FRE ASSY	●	●	●	●	127V/52W
	DA97-00195D	DRAIN PLATE FRE ASSY	●	●	●	●	115V/52W
	DA97-00195E	DRAIN PLATE FRE ASSY	●	●	●	●	220V/52W

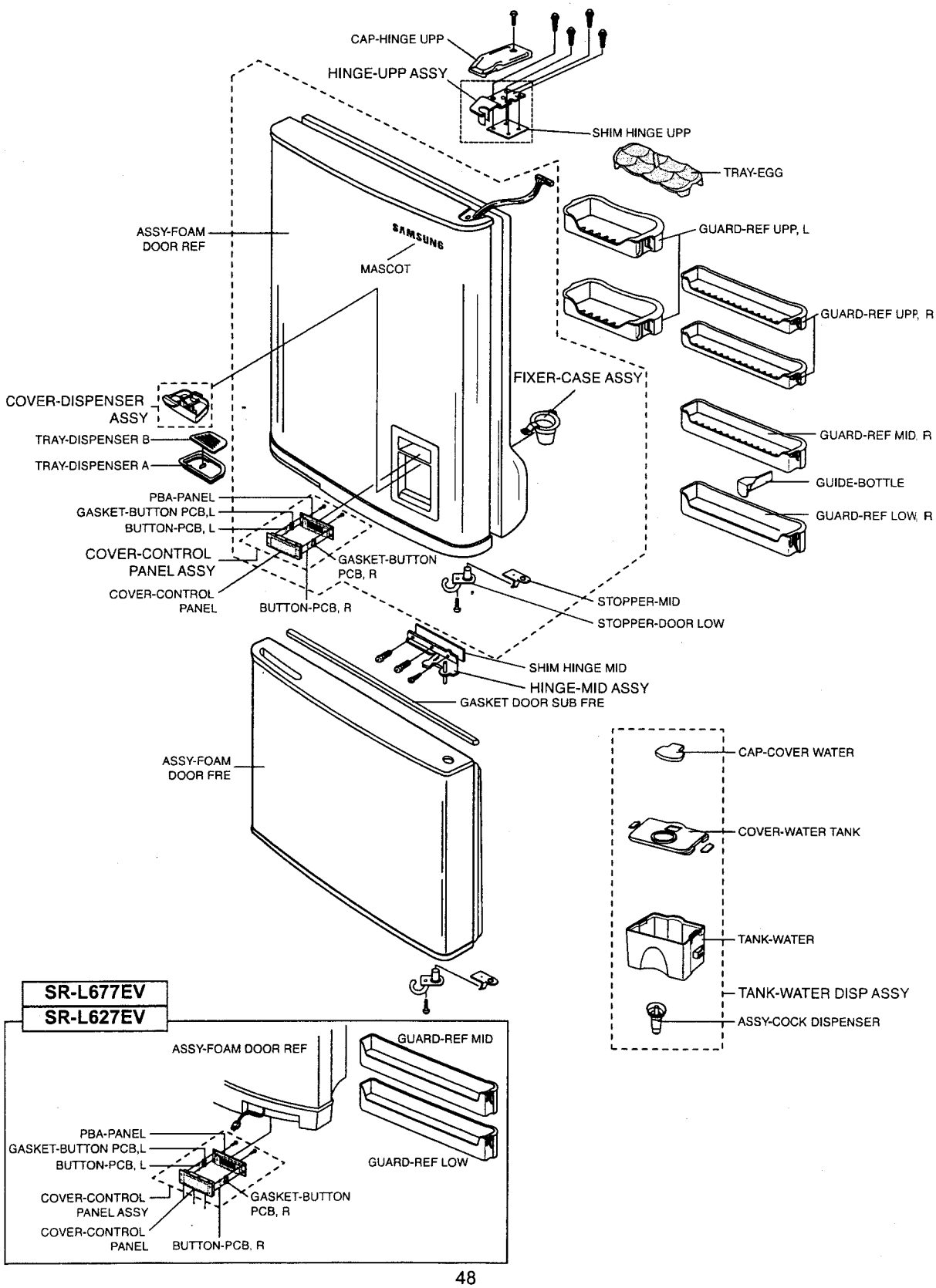
9-2. Refrigeration room



NO	CODE-NO	PART NAME	OPTION				SPEC
			SR-L627	SR-L629	SR-L677	SR-L679	
1	DA97-00104A	CASE-VEG,ASSY	●	●			
	DA97-00184A	CASE-VEG,ASSY			●	●	
2	DA67-10225A	CASE-VEG	●	●			
	DA67-10229A	CASE-VEG			●	●	
3	DA63-10359B	COVER-VEG	●	●	●	●	
4	DA66-10104A	ROLLER FRE	●	●	●	●	
5	DA71-20145A	FIXER ROLLER	●	●	●	●	
6	DA68-50153H	INLAY-COVER VEG	●	●	●	●	
7	DA63-00936A	COVER-VEG ASS'Y	●	●			
	DA63-00936B	COVER-VEG ASS'Y			●	●	
8	DA64-00449A	TRIM-COVER,VEG	●	●			
	DA64-00448A	TRIM-COVER,VEG			●	●	
9	DA67-00505D	SHELF GLASS	●	●			COVER VEG
	DA67-00505E	SHELF GLASS			●	●	COVER VEG
10	DA67-00550A	SHELF REF-MID,ASSY	●	●			
	DA67-00550B	SHELF REF-MID,ASSY			●	●	
11	DA67-00550C	SHELF REF-UPP,ASSY	●	●			
	DA67-00550D	SHELF REF-UPP,ASSY			●	●	
12	DA64-00450A	TRIM-SHELF REF	●	●			SHELF(MID/UPP)
	DA64-00451A	TRIM-SHELF REF			●	●	SHELF(MID/UPP)
13	DA67-00505B	SHELF GLASS	●	●			SHELF(MID/UPP)
	DA67-00505C	SHELF GLASS			●	●	SHELF(MID/UPP)
14	DA61-00368A	RAIL-CHILLED,L	●	●			SHELF-UPP
	DA61-00367A	RAIL-CHILLED,L			●	●	SHELF-UPP
15	DA61-00370A	RAIL-CHILLED,R	●	●			SHELF-UPP
	DA61-00369A	RAIL-CHILLED,R			●	●	SHELF-UPP
16	DA67-40194A	TRAY-VEG	●	●	●	●	
17	DA97-00296A	TRAY CHIL ROOM-ASSY	●	●			
	DA63-00945B	TRAY CHIL ROOM-ASSY			●	●	
18	DA63-00925A	COVER-LAMP REF	●	●	●	●	
19	4713-001147	LAMP-INCANDESCENT	●	●	●	●	230V, 2W
	4713-001145	LAMP-INCANDESCENT	●	●	●	●	130V, 3W
	4713-000175	LAMP-FLUORESCENT	●	●	●	●	ALL
20	DA59-00243A	EVAP-REF ASSY	●	●	●	●	240V, 12W
	DA96-00017A	EVAP-REF ASSY	●	●	●	●	220V, 12W
	DA96-00017B	EVAP-REF ASSY	●	●	●	●	127V, 12W
	DA96-00017C	EVAP-REF ASSY	●	●	●	●	115V, 12W
21	DA32-10105G	SENSOR ASSY	●	●	●	●	EVAP-RF
22	DA47-00095D	ASSY-FUSE THERMO(R)(77˚C)	●	●	●	●	EVAP-REF250V
23	DA97-00495A	COVER-EVAP REF ASSY	●	●	●	●	230-240V,50Hz
	DA97-00495B	COVER-EVAP REF ASSY	●	●	●	●	220V, 50~60Hz
	DA97-00495C	COVER-EVAP REF ASSY	●	●	●	●	115~127V,60Hz
24	DA63-00933A	COVER-EVAP FR REF	●	●	●	●	
25	DA63-00932A	COVER-EVAP RE REF	●	●	●	●	
26	DA63-00183A	COVER-MOTOR	●	●	●	●	
27	DA31-00016A	FAN-CIRCUIT	●	●	●	●	
28	DA63-00934A	COVER-SENSOR REF	●	●	●	●	

NO	CODE-NO	PART NAME	OPTION				SPEC
			SR-L627	SR-L629	SR-L677	SR-L679	
29	DA64-00452A	TRIM-COVER SENSOR	●	●	●	●	
30	DA60-00033A	SPACER-DUCT	●	●	●	●	220V~240/50Hz
31	DA31-00003L	MOTOR-FAN	●	●	●	●	220V/50~60Hz
	DA31-00003P	MOTOR-FAN	●	●	●	●	115V~127/60Hz
	DA31-00003N	MOTOR-FAN	●	●	●	●	
32	DA63-00771A	GROMMET-MOTOR	●	●	●	●	
33	DA32-10109H	SENSOR ASSY	●	●	●	●	COVER EVAP
34	DA62-00106A	SEAL-COVER EVAP RE	●	●	●	●	
35	DA62-00109A	SEAL AIR SIDE	●	●	●	●	
36	DA70-00402A	PLATE-DRAIN REF ASSY	●	●	●	●	240V/38W
	DA97-00441A	PLATE-DRAIN REF ASSY	●	●	●	●	127V/38W
	DA97-00441B	PLATE-DRAIN REF ASSY	●	●	●	●	115V/38W
	DA97-00441C	PLATE-DRAIN REF ASSY	●	●	●	●	220V/38W

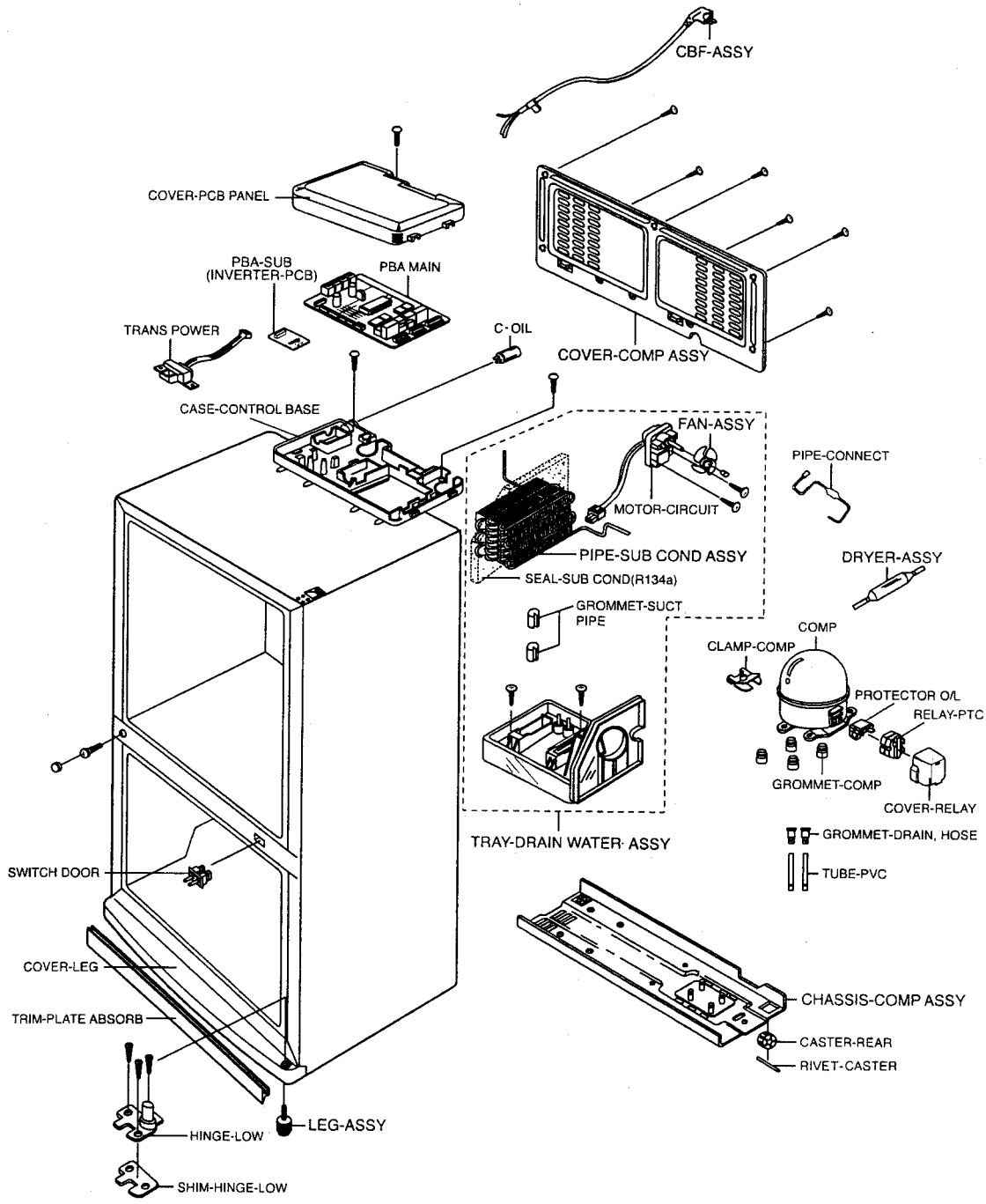
9-3. Door parts



NO	CODE-NO	PART NAME	OPTION				SPEC
			SR-L627	SR-L629	SR-L677	SR-L679	
1	DA91-01467A	ASSY FOAM-DOOR REF		●		●	S/W(COOL TECH)
	DA91-01467B	ASSY FOAM-DOOR REF		●		●	S/W(Cool n'cool)
	DA91-01467C	ASSY FOAM-DOOR REF		●		●	M/G(COOL TECH)
	DA91-01467D	ASSY FOAM-DOOR REF		●		●	M/G(Cool n'cool)
	DA91-01467E	ASSY FOAM-DOOR REF		●		●	N/B(COOL TECH)
	DA91-01467F	ASSY FOAM-DOOR REF		●		●	N/B(Cool n'cool)
	DA91-01467G	ASSY FOAM-DOOR REF		●		●	N/S(COOL TECH)
	DA91-01467H	ASSY FOAM-DOOR REF		●		●	N/S(Cool n'cool)
	DA91-01466A	ASSY FOAM-DOOR REF	●		●		S/W(COOL TECH)
	DA91-01466B	ASSY FOAM-DOOR REF	●		●		S/W(Cool n'cool)
	DA91-01466C	ASSY FOAM-DOOR REF	●		●		M/G(COOL TECH)
	DA91-01466D	ASSY FOAM-DOOR REF	●		●		M/G(Cool n'cool)
	DA91-01466E	ASSY FOAM-DOOR REF	●		●		N/B(COOL TECH)
	DA91-01466F	ASSY FOAM-DOOR REF	●		●		N/B(Cool n'cool)
	DA91-01466G	ASSY FOAM-DOOR REF	●		●		N/S(COOL TECH)
	DA91-01466H	ASSY FOAM-DOOR REF	●		●		N/S(Cool n'cool)
2	DA64-00166A	MASCOT	●	●	●	●	SAMSUNG
3	DA71-40135A	STOPPER-MID	●	●	●	●	
4	DA71-40183C	STOPPER DOOR-LOW	●	●	●	●	
5	DA91-01468A	ASSY FOAM-DOOR FRE	●	●	●	●	SNOW WHITH
	DA91-01468B	ASSY FOAM-DOOR FRE	●	●	●	●	SNOW WHTE
	DA91-01468C	ASSY FOAM-DOOR FRE	●	●	●	●	METAL GRAY
	DA91-01468D	ASSY FOAM-DOOR FRE	●	●	●	●	METAL GRAY
	DA91-01468E	ASSY FOAM-DOOR FRE	●	●	●	●	NOBLE BEIGE
	DA91-01468F	ASSY FOAM-DOOR FRE	●	●	●	●	NOBLE BEIGE
	DA91-01468G	ASSY FOAM-DOOR FRE	●	●	●	●	NOBLE STAIN
	DA91-01468H	ASSY FOAM-DOOR FRE	●	●	●	●	NOBLE STAIN
6	DA63-01052A	GASKET-DOOR SUB FRE	●	●	●	●	
7	DA63-00926B	GUARD-REF UPP, L	●	●	●	●	
8	DA63-00927A	GUARD-REF UPP, R	●	●	●	●	
9	DA63-00929A	GUARD-REF MID, R		●		●	
10	DA63-00928A	GUARD-REF MID	●		●		
11	DA63-00930A	GUARD-REF LOW, R		●		●	
12	DA63-00931A	GUARD-REF LOW	●		●		
13	DA66-00058A	TRAY-EGG	●	●	●	●	
14	DA61-00365A	GUIDE-BOTTLE	●	●	●	●	
15	DA61-00378A	HINGE-UPP,ASSY	●	●	●	●	
16	DA61-00361A	HINGE-UPP	●	●	●	●	
17	DA63-50145A	SHIM-HINGE UPP	●	●	●	●	
18	DA67-00546A	CAP-HINGE UPP	●	●	●	●	SNOW WHITH
	DA67-00546B	CAP-HINGE UPP	●	●	●	●	METAL GRAY
	DA67-00546C	CAP-HINGE UPP	●	●	●	●	NOBLE BEIGE
	DA67-00546D	CAP-HINGE UPP	●	●	●	●	NOBLE STAIN
19	DA61-10153E	HINGE-MID,ASSY	●	●	●	●	
20	DA61-10142C	HINGE-MID	●	●	●	●	
21	DA63-50139C	SHIM-HINGE MID	●	●	●	●	
22	DA63-00943A	COVER-CONTROL PANEL,ASSY		●		●	SNOW WHITE
	DA97-00353A	COVER-CONTROL PANEL,ASSY		●		●	METAL GRAY
	DA97-00353B	COVER-CONTROL PANEL,ASSY		●		●	NOBLE BEIGE
	DA97-00353C	COVER-CONTROL PANEL,ASSY		●		●	NOBLE STAIN

NO	CODE-NO	PART NAME	OPTION				SPEC
			SR-L627	SR-L629	SR-L677	SR-L679	
23	DA63-01046A	COVER-CONTROL PANEL		●		●	SNOW WHITH
	DA63-01046B	COVER-CONTROL PANEL		●		●	METAL GRAY
	DA63-01046C	COVER-CONTROL PANEL		●		●	NOBLE BEIGE
	DA63-01046D	COVER-CONTROL PANEL		●		●	NOBLE STAIN
24	DA64-00444A	BUTTON-PCB, L, SILVER	●	●	●	●	SILVER
	DA64-00444B	BUTTON-PCB, L, GOLD	●	●	●	●	GOLD
25	DA64-00445A	BUTTON-PCB, R, SILVER	●	●	●	●	SILVER
	DA64-00445B	BUTTON-PCB, R, GOLD	●	●	●	●	GOLD
26	DA63-00915A	GASKET BUTTON PCB, L	●	●	●	●	
27	DA63-00916A	GASKET BUTTON PCB, R	●	●	●	●	
28	DA41-00102A	PANEL-PCB	●	●	●	●	
29	DA63-00942A	COVER-CONTROL PANEL,ASSY	●		●		SNOW WHITH
	DA63-00352A	COVER-CONTROL PANEL,ASSY	●		●		METAL GRAY
	DA63-00352B	COVER-CONTROL PANEL,ASSY	●		●		NOBLE BEIGE
	DA63-00352C	COVER-CONTROL PANEL,ASSY	●		●		NOBLE STAIN
30	DA63-00909A	COVER-CONTROL PANEL	●		●		SNOW WHITH
	DA63-00909B	COVER-CONTROL PANEL	●		●		METAL GRAY
	DA63-00909C	COVER-CONTROL PANEL	●		●		NOBLE BEIGE
	DA63-00909D	COVER-CONTROL PANEL	●		●		NOBLE STAIN
31	DA64-00444A	BUTTON-PCB, L	●	●	●	●	SILVER
	DA64-00444B	BUTTON-PCB, L	●	●	●	●	GOLD
32	DA64-00445A	BUTTON-PCB, R	●	●	●	●	SILVER
	DA64-00445B	BUTTON-PCB, R	●	●	●	●	GOLD
33	DA63-00915A	GASKET BUTTON PCB, L	●	●	●	●	
34	DA63-00916A	GASKET BUTTON PCB, R	●	●	●	●	
35	DA41-00102A	PANEL-PCB	●	●	●	●	
36	DA97-00193A	COVER-DISPENSER ASSY		●		●	SNOW WHITH
	DA97-00193B	COVER-DISPENSER ASSY		●		●	METAL GRAY
	DA97-00193C	COVER-DISPENSER ASSY		●		●	NOBLE BEIGE
	DA97-00193D	COVER-DISPENSER ASSY		●		●	NOBLE STAIN
37	DA63-00906B	TRAY-DISPENSER A		●		●	SNOW WHITH
	DA63-00906C	TRAY-DISPENSER A		●		●	METAL GRAY
	DA63-00906D	TRAY-DISPENSER A		●		●	NOBLE BEIGE
	DA63-00906E	TRAY-DISPENSER A		●		●	NOBLE STAIN
38	DA63-00905B	TRAY-DISPENSER B		●		●	SNOW WHITH
	DA63-00905C	TRAY-DISPENSER B		●		●	METAL GRAY
	DA63-00905D	TRAY-DISPENSER B		●		●	NOBLE BEIGE
	DA63-00905E	TRAY-DISPENSER B		●		●	NOBLE STAIN
39	DA97-00216A	ASSY TANK-WATER		●		●	
40	DA67-30216A	CAP-COVER WATER		●		●	
41	DA63-00902A	COVER-WATER TANK		●		●	
42	DA67-00545A	TANK-WATER		●		●	
43	DA97-00217A	ASSY-COCK DISP		●		●	
44	DA71-20155B	FIXER-CASE ASSY		●		●	

9-4. Cabinet parts & unit



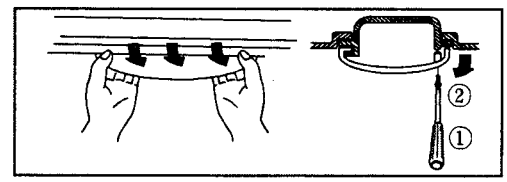
NO	CODE-NO	PART NAME	OPTION				SPEC
			SR-L627	SR-L629	SR-L677	SR-L679	
1	DA60-90124A	REVET-CASTER	●	●	●	●	
2	DA61-40101C	CASTER REAR	●	●	●	●	
3	DA61-00178A	LEG-ASSY	●	●	●	●	
4	DA61-10145D	HINGE-LOW	●	●	●	●	
5	DA64-20138B	TRIM-PLATE,ABSORB	●	●	●	●	
6	DA63-50146A	SHIM-HINGE,LOW	●	●	●	●	
7	DA63-10262F	COVER-LEG	●	●	●	●	SNOW WHITH
	DA63-10262A	COVER-LEG	●	●	●	●	METAL GRAY
	DA63-10262B	COVER-LEG	●	●	●	●	NOBLE BEIGE
	DA63-10262N	COVER-LEG	●	●	●	●	NOBLE STAIN
8	DA34-00024A	SWITCH DOOR	●	●	●	●	R600a
	DA34-00122D	SWITCH DOOR	●	●	●	●	R134a
9	DA67-10508A	CASE-CONTROL BASE	●	●	●	●	
10	DA26-30111H	TRANS POWER	●	●	●	●	220~240V
	DA26-30111C	TRANS POWER	●	●	●	●	127V
	DA26-30111F	TRANS POWER	●	●	●	●	115V
11	2501-001185	C-OIL	●	●	●	●	350V, 3.5uF
	2501-001186	C-OIL	●	●	●	●	350V, 5uF
	2501-001045	C-OIL	●	●	●	●	350V, 8uF
	2501-001187	C-OIL	●	●	●	●	250V, 12uF
12	DA63-10212J	COVER-PCB PANEL	●	●	●	●	SNOW WHITH
	DA63-10212B	COVER-PCB PANEL	●	●	●	●	METAL GRAY
	DA63-10212E	COVER-PCB PANEL	●	●	●	●	NOBLE BEIGE
	DA63-10212M	COVER-PCB PANEL	●	●	●	●	NOBLE STAIN
13	DA41-00099A	PBA-MAIN	●	●	●	●	220V~ 240V
	DA41-00099B	PBA-MAIN	●	●	●	●	115~127V
14	DA41-20148A	PBA-SUB	●	●	●	●	INVERTER-PCB
15	DA63-00951A	GROMMET-DRAIN HOSE	●	●	●	●	ø10
	DA63-00951B	GROMMET-DRAIN HOSE	●	●	●	●	
16	DA62-20001Q	TUBE-PVC	●	●	●	●	
17	DA63-10564H	COVER-COMP ASSY	●	●	●	●	
18	DA31-00010B	FAN-ASSY	●	●	●	●	
19	DA31-10110H	MOTOR-CIRCUIT	●	●	●	●	230V~240V/50Hz
	DA31-10110F	MOTOR-CIRCUIT	●	●	●	●	220V/50~60Hz
	DA31-10110L	MOTOR-CIRCUIT	●	●	●	●	127V/60Hz
	DA31-10110G	MOTOR-CIRCUIT	●	●	●	●	115V/60Hz
20	DA73-10109A	PIPE-CONNECT	●	●	●	●	
21	DA63-40171B	GROMMET-SUCT PIPE	●	●	●	●	
22	DA97-00180A	TRAY-DRAIN WATER ASSY	●	●	●	●	230V~240V(R600a)
	DA97-00180B	TRAY-DRAIN WATER ASSY	●	●	●	●	230V~240V(R134a)
	DA97-00180C	TRAY-DRAIN WATER ASSY	●	●	●	●	220V(R134a)
	DA97-00180D	TRAY-DRAIN WATER ASSY	●	●	●	●	127V(R134a)
	DA97-00180E	TRAY-DRAIN WATER ASSY	●	●	●	●	115V(R134a)
23	DA73-10314G	PIPE-SUB COND ASSY	●	●	●	●	
24	DA65-20101B	CLAMP-COMP	●	●	●	●	
25	MK4A3QL1U/E01	COMPRESSOR	●	●	●	●	R600a
	DK182Q-L2U	COMPRESSOR	●	●	●	●	R134a
	SK190H-L2U	COMPRESSOR	●	●	●	●	R134a
	DK(MK)172P-L2U	COMPRESSOR	●	●	●	●	R134a
	DK(MK)172C-L2U	COMPRESSOR	●	●	●	●	R134a
26	DA73-30102B	DRYER-ASSY	●	●	●	●	
27	DA34-10003C	PROTECTOR O/L	●	●	●	●	4TM232PHBYY-5J
	DA34-10003F	PROTECTOR O/L	●	●	●	●	4TM265RFBYY-5J
	DA34-20003W	PROTECTOR O/L	●	●	●	●	4TM314PHBYY-5J
	DA34-10003T	PROTECTOR O/L	●	●	●	●	4TM435PHBYY-5J
	DA34-10003D	PROTECTOR O/L	●	●	●	●	4TM437RHBYY-5J
28	DA35-10013B	RELAY-PTC	●	●	●	●	J531Q35E330M385-(
	DA35-10013L	RELAY-PTC	●	●	●	●	J531Q34E220M350-(
	DA35-10013M	RELAY-PTC	●	●	●	●	J531Q33E100M200-(
29	DA63-10352A	COVER-RELAY	●	●	●	●	
30	DA71-60141D	CHASSIS-COMP ASSY	●	●	●	●	
31	DA61-40101C	CASTER-REAR	●	●	●	●	
32	DA60-90101A	RIVET-CASTER	●	●	●	●	
33	DA63-40004A	GROMMET COMP	●	●	●	●	
34	DA62-00217A	SEAL-SUB COND	●	●	●	●	R134a

10. Disassembly & Assembly

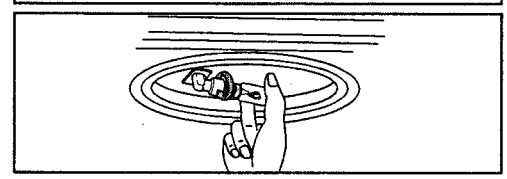
10-1. Replacement of refrigerator lamp

Warning
Always take out the power plug when replacing the refrigerator lamp. There is the danger of electric shock.

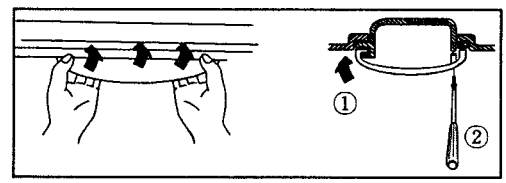
1. Remove the cover with the back latch pressed.



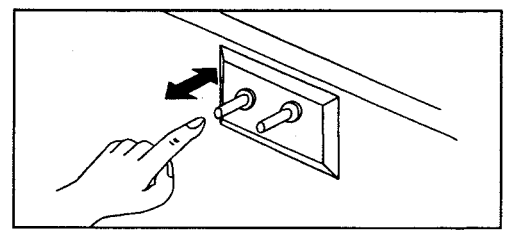
2. Pull out the lamp.



3. After replacing the lamp, assemble the front latch of cover and then connect the back latch.



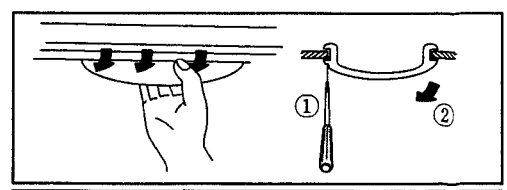
4. Plug in and check if power is cut off or not by pressing the R-door switch.



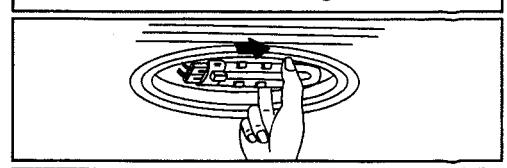
10-2. Replacement of refrigerator fluorescent lamp

Warning
Always take out the power plug when replacing the refrigerator lamp. There is the danger of electric shock.

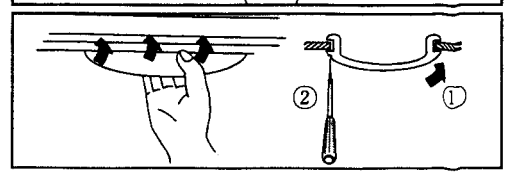
1. Remove a screw from the cover and pull down the cover with the back latch pressed.



2. Pull out the lamp.



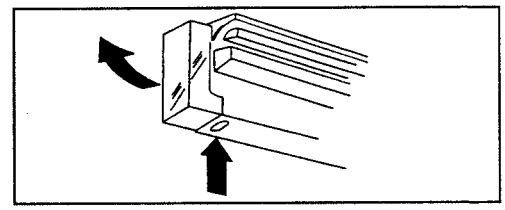
3. After replacing the lamp, assemble the front latch of cover and then connect the back latch and screw on the cover.



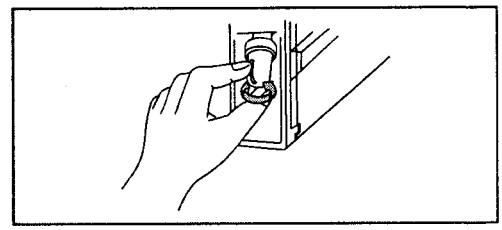
10-3. Replacement of freezer lamp

Warning
Always take out the power plug when replacing the refrigerator lamp. There is the danger of electric shock.

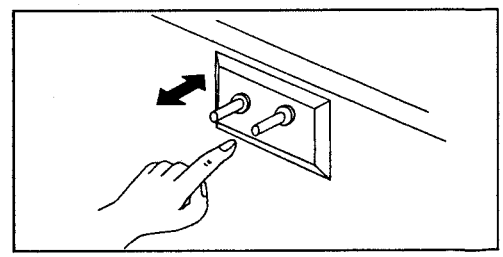
1. Remove the cover by pressing the bottom latch.



2. Replace the lamp by turning it counter-clock wise.

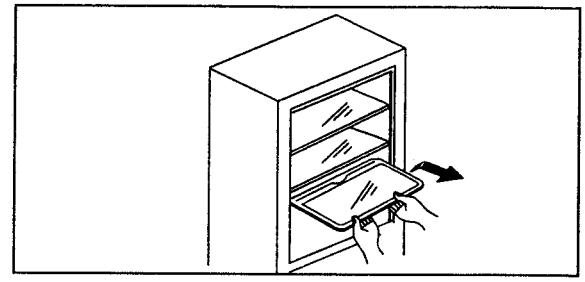


3. Reassemble the cover in the reverse order of disassembly and plug in and the check if power is cut off by pressing the door switch.

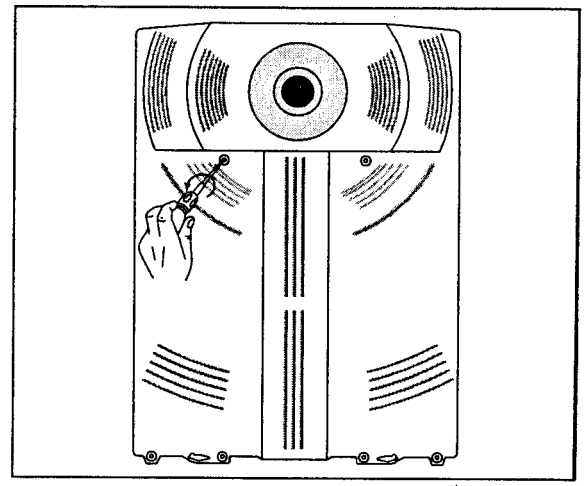


10-4. Disassembly of the cooling cycle in the refrigeration room

1. Take out food stuffs and trays from refrigeration room.



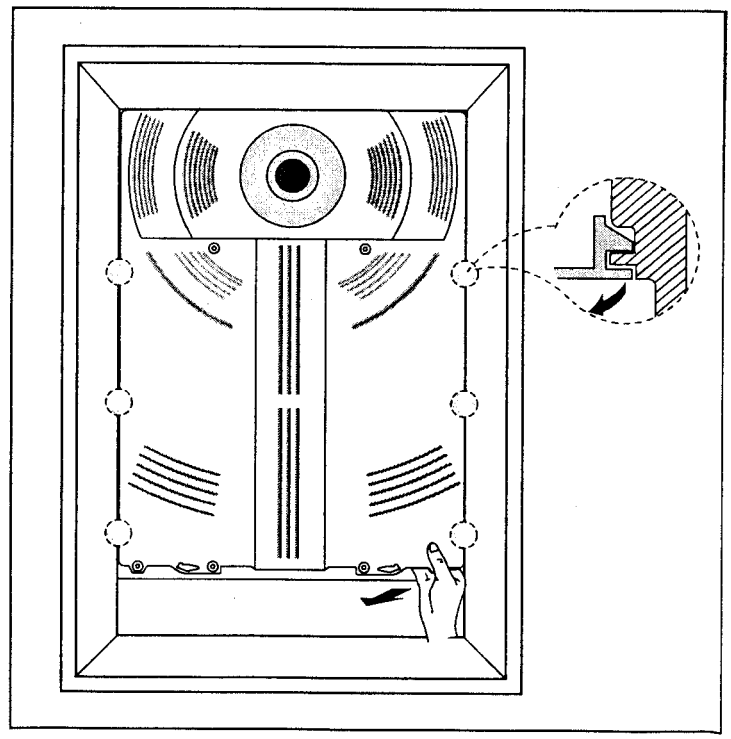
2. Remove 4 cap screws with (–) driver or similar tools.



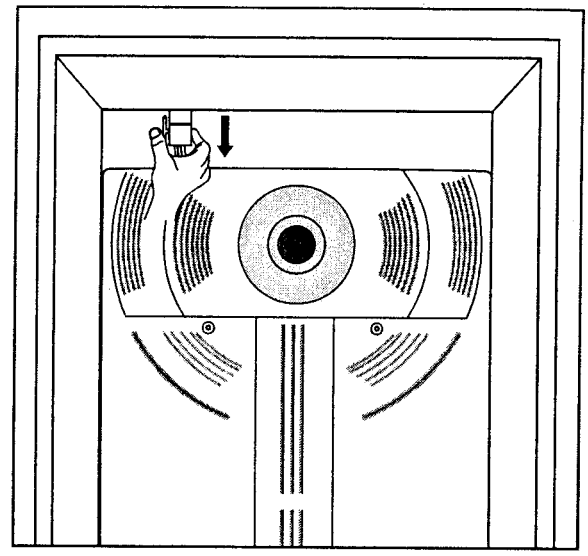
3. Remove 6 screws from the cover-evap. ref. assy

4. Remove 2 latches from the bottom of the cover in the front of evaporator.

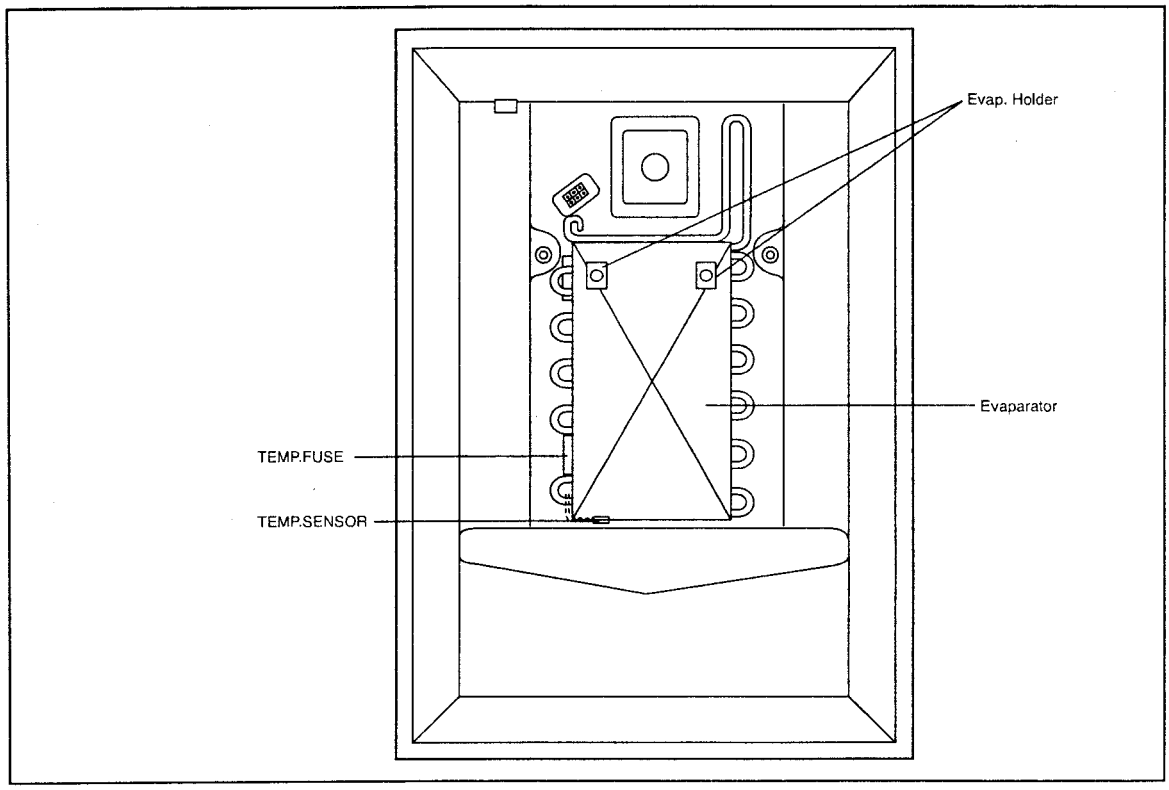
5. Remove the evaporator cover by pulling out the bottom of the evaporator cover.



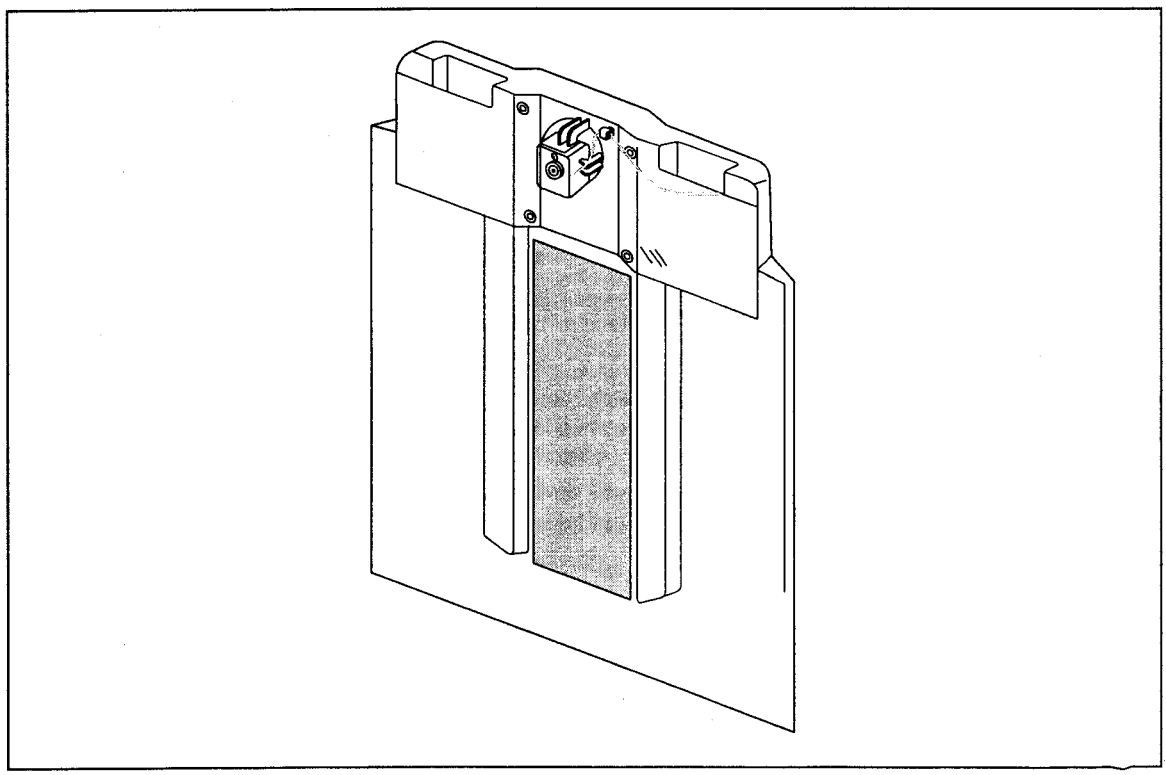
6. Remove the housing of wires.



■ Cooling cycle unit assembly in the refrigeration compartment

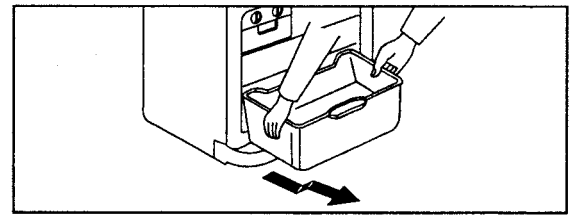


■ Dust assembly in the refrigeration compartment

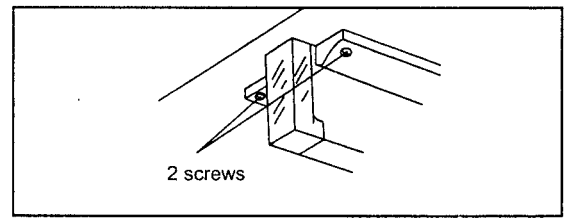


10-5. Disassembly of the cooling cycle unit in the freezer

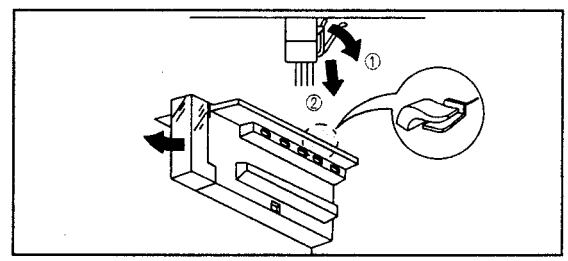
1. Take out the case from the freezer.



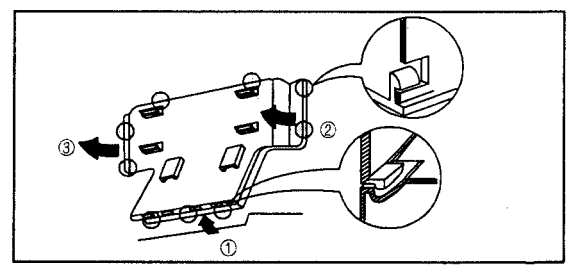
2. Remove 2 screws from the assy-supt free.



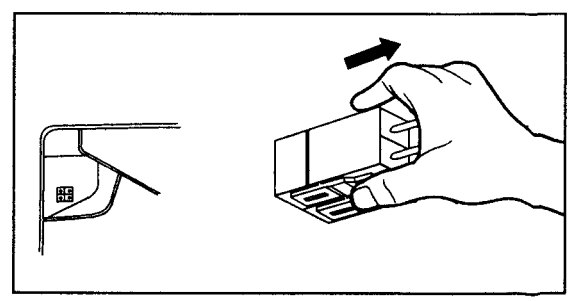
3. Pull out the holder of the assy-supt free and disconnect wire terminals.



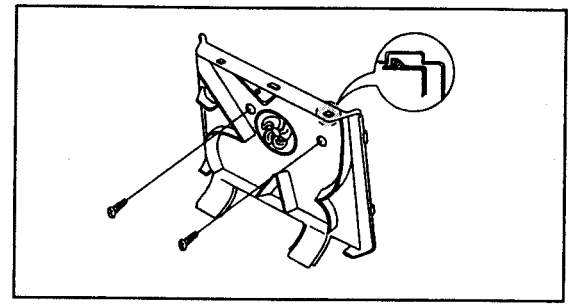
4. Remove the latch of the cover-evap fr. from the buttom.



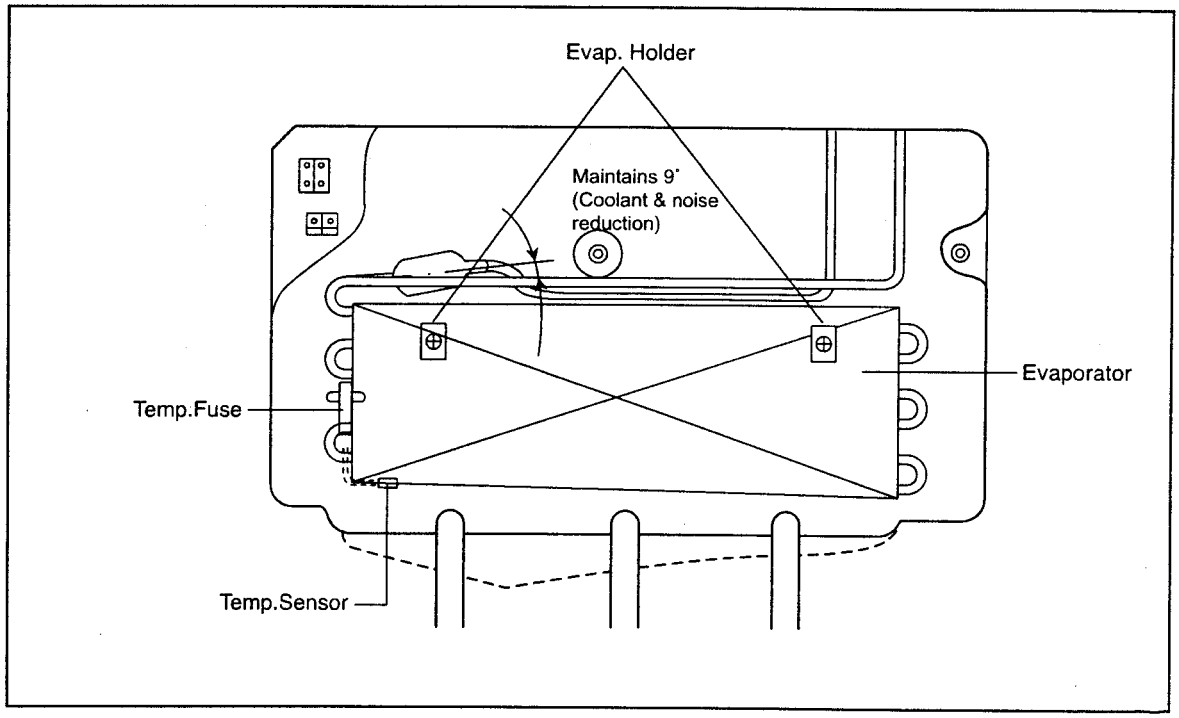
5. Remove each terminal from the top of the left wire assembly.



6. Remove 2 screws from the back cover of the cooling cycle unit and remove the latch with (–) driver.

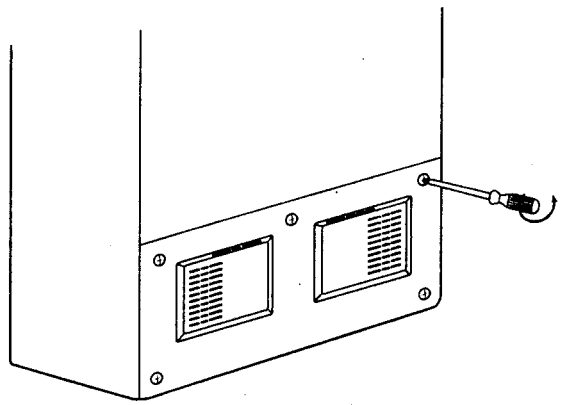


■ Assembly of the cooling cycle unit in the freezer

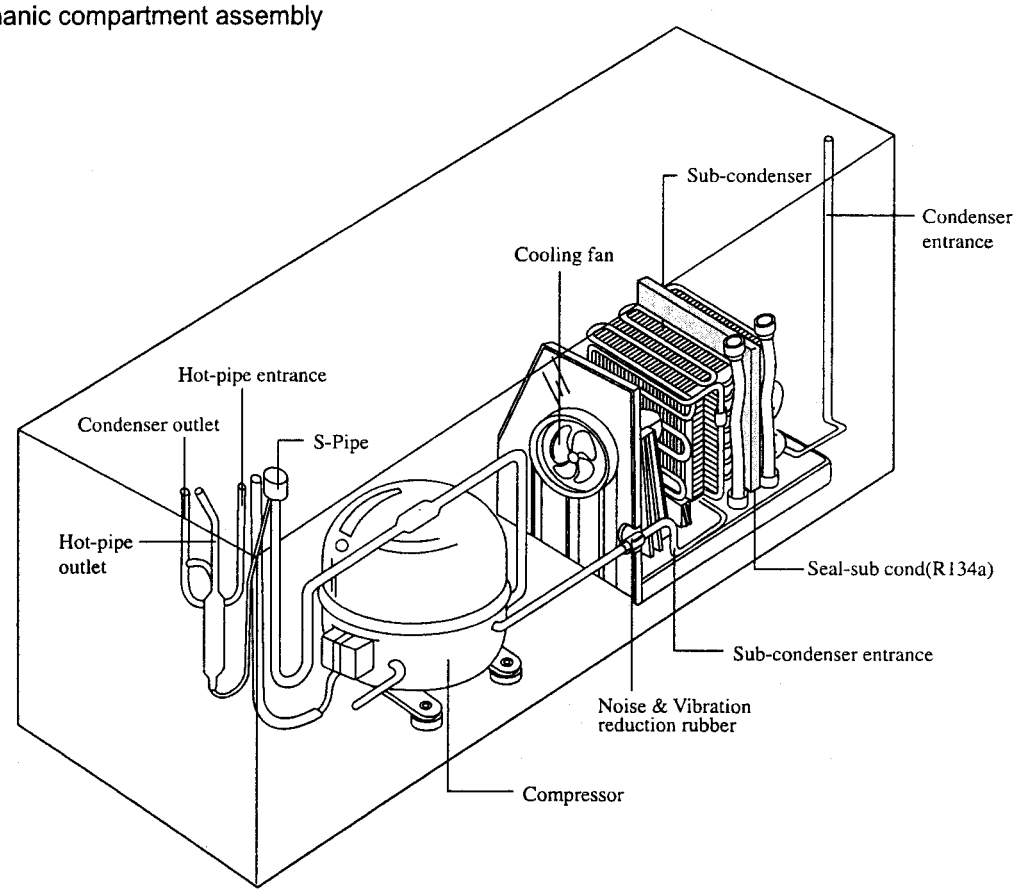


10-6. Assembly of mechanic compartment in the refrigerator

1. Remove the screws securing the mechanic compartment cover of the back bottom of the refrigerator.



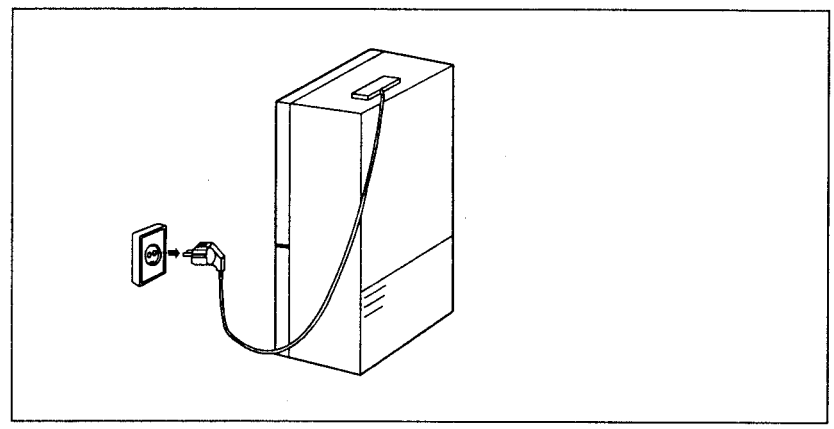
2. Mechanic compartment assembly



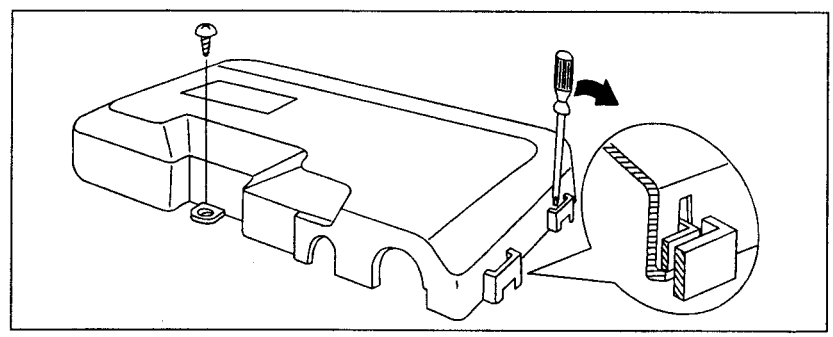
10-7. Electric box assembly

Warning
Make sure the power plug is taken out when replacing the components for the main PCB.

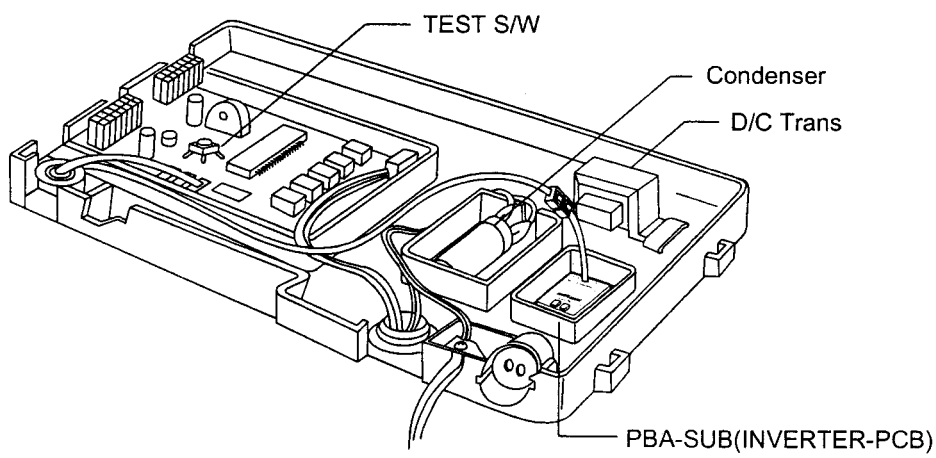
1. Disconnect the power cord.



2. Remove the cover of electrical box with (–) driver.



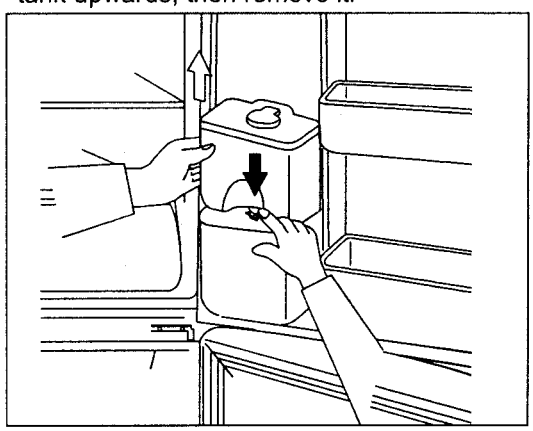
3. Assembly specification of electric box



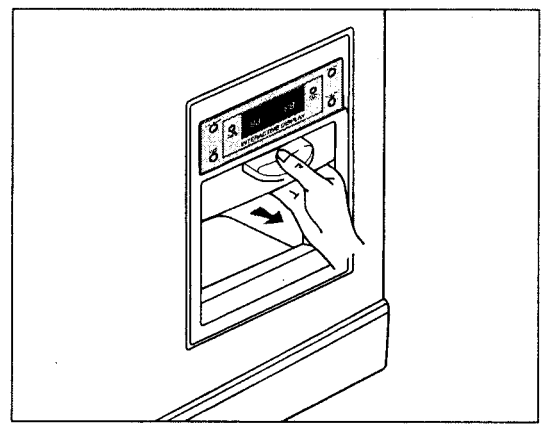
10-8. Temperature controller disassembly

1. With dispenser model.

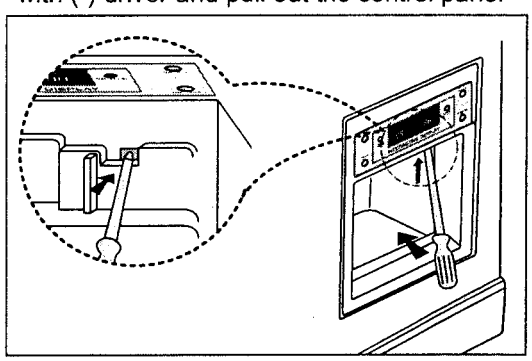
1-1) Press the fixing lever, lift the exclusive water tank upwards, then remove it.

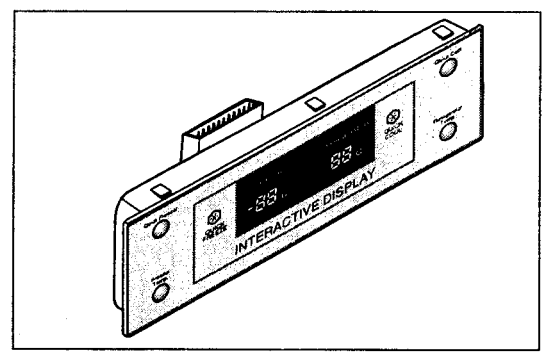


1-2) Pull out the assembly press lever.

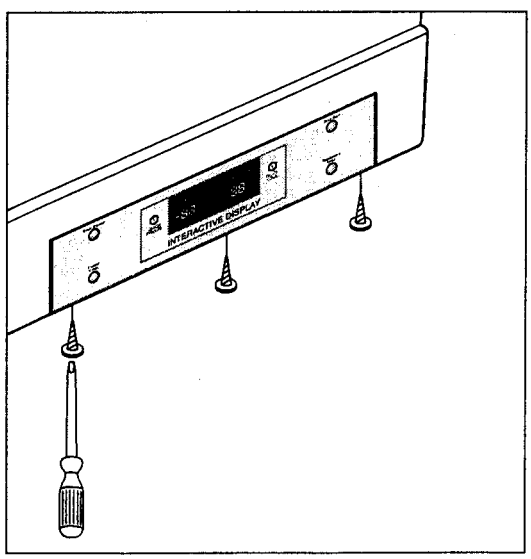


1-3) Push the latch of control panel assembly with (-) driver and pull out the control panel



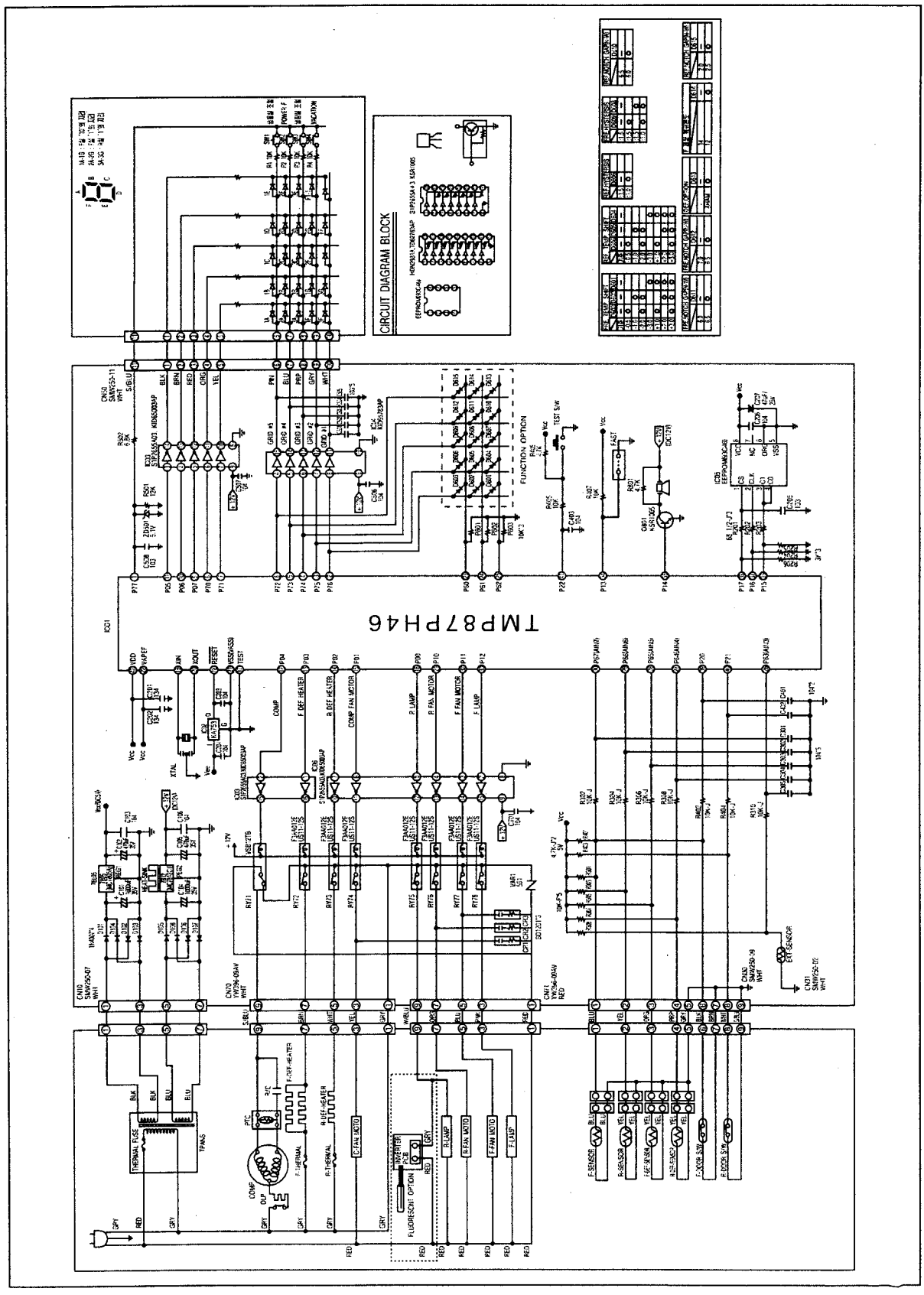


2. Without dispenser model



2-1) Remove 3 screws from the assembly control panel and pull out the assembly control panel.

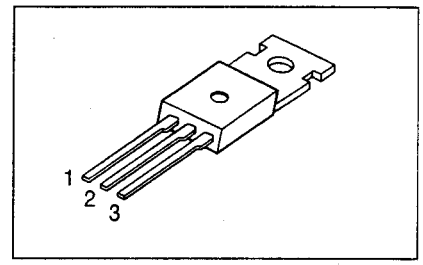
11. PCB Circuit Diagram



12. Specifications of main components

12-1 Regulator

3-TERMINAL 1A POSITIVE VOLTAGE REGULATORS



The MC78XX/MC78XXA series of three-terminal positive regulators are available in the TO-220 package and with several fixed output voltages, making it useful in a wide range of applications. These regulators can provide local onward regulation, eliminating the distribution problems associated with single point regulation. Each type employs internal current limiting, thermal shut-down and safe area protection, making it essentially indestructible. If adequate heat sinking is provided, they can derive over aA output current. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltages and currents. MC78XXI is characterized for operation from -40°℃ to +125℃, and MC78XXC from 0℃ to +125℃.
TO-220 1 2 3 1 : Input 2 : GND 3 : Output

FEATURES

- Output Current up to 1.5A
- Output voltages of 5;6;8;9;10;11;12;15;18;24V
- Thermal Overload Protection
- Short Circuit Protection
- Output Transistor SOA Protection
- No external components required
- Output current in excess of 1A
- Industrial and commercial temperature range

ORDERING INFORMATION

Device	Package	Operating Temperature
MC78XXCT	TO-220	0~+125℃
MC78XXACT	TO-220	
MC78XXT	TO-220	-40~+125℃

BLOCK DIAGRAM

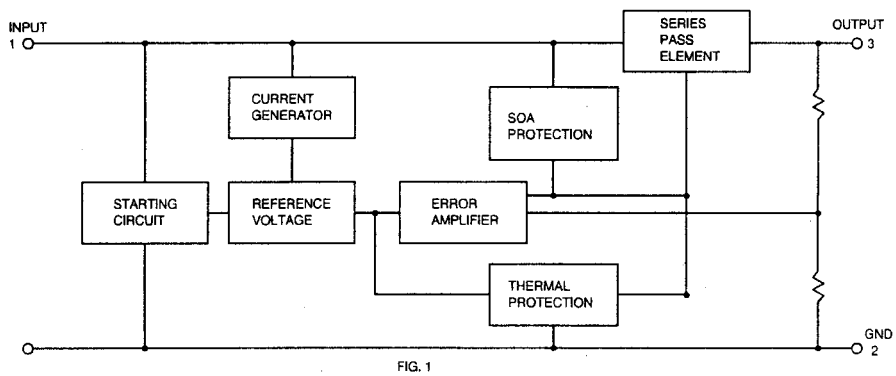


FIG. 1

ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Rating	Unit
Input Voltage (for V_O = 5V to 18V)	V_{IN}	35	V
(for V_O = 24V)	V_{IN}	40	V
Thermal Resistance Junction - Cases	θ_{JC}	5	℃/W
Thermal Resistance Junction - Air	θ_{JA}	65	θ/W
Operating Temperature Range MC78XXC/AC	T_{opr}	0 ~ +125	℃
MC78XXI		-40 ~ +125	℃
Storage Temperature Range	Tstg	-65 ~ +150	℃

REGULATOR(MC7812C)

ELECTRICAL CHARACTERISTICS MC7812

(Refer to test circuit, $T_{min} < T_i < T_{max}$, V_i = 500mA, V_i = 19V, C_i = 0.33μF, C_o = 1.0μF unless otherwise specified)

Characteristic	Symbol	Test Conditions	MC7805C			Unit
			Min	Typ	Max	
Output Voltage	V_o	Ti = 25℃	11.5	12	12.5	V
		5.0mA ≤ I_o ≤ 1.0A, P_o ≤ 15W V_{in} = 14.5V to 27V V_i = 15.5V to 27V	11.4	12	12.6	
Line Regulation	$\triangle V_o$	Ti = 25℃, V_i = 14.5V to 30V		10	240	mV
		Ti = 25℃, V_i = 16V to 22V		3.0	120	
Load Regulation	$\triangle V_o$	Ti = 25℃, I_o = 5.0mA to 1.5V		12	240	mV
		Ti = 25℃, I_o = 250mA to 750mA		4.0	120	
Quiescent Current	I_d	T_i = 25℃		5.1	8	mA
Quiescent Current Change	$\triangle I_d$	Io = 5mA to 1.0A			0.5	mA
		V_i = 14.5V to 30V			1.0	
		V_i = 15V to 30V				
Output Voltage Drift	$\triangle V_o/\triangle T$	I_o = 5mA		-1		mV/℃
Output Noise Boltage	V_n	f = 10Hz to 100KHz T_i = 25℃		75		μV
Ripple Rejection	RR	fF = 120Hz V_i = 15 to 25V	55	71		dB
Dropout Voltage	V_D	I_o = 1A, T_i = 25℃		2		V
Output Resistance	R_o	f = 1KHz		18		mΩ
Short Circuit Current	I_{SC}	V_i = 35V, T_i = 25℃		250		mA
Peak Current	I_{peak}	T_i = 25℃		2.2		A

* $T_{min} < T_i < T_{max}$
  MC78XXI : T_{min} = -40℃, T_{max} = 125℃
  MC78XXC, T_{min} = 0℃, T_{max} = 125℃
* Load and line regulation are specified at constant junction temperature. Changes in V_o due to heating effects must be taken into account separately. Pulse testing with low duty is used.

FAIRCHILD
SEMICONDUCTOR®

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KA78LXXA/KA78L05AA

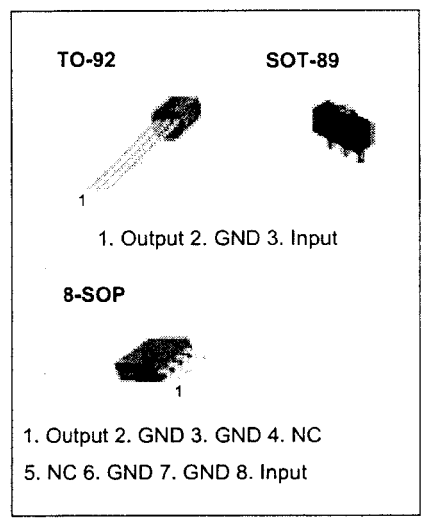
3-Terminal 0.1A Positive Voltage Regulator

Features

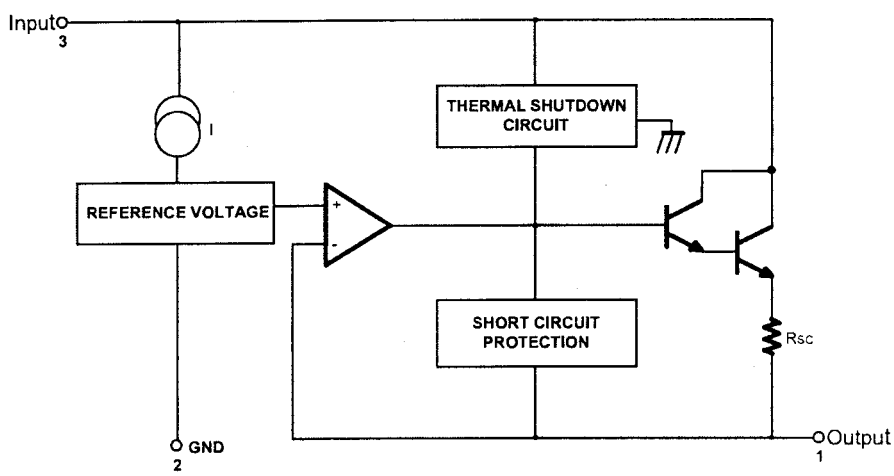
- Maximum Output Current of 100mA
- Output Voltage of 5V, 6V, 8V, 9V,10V, 12V, 15V, 18V and 24V
- Thermal Overload Protection
- Short Circuit Current Limiting
- Output Voltage Offered in ± 5% Tolerance

Description

The KA78LXXA/KA78L05AA series of fixed voltage monolithic integrated circuit voltage regulators are suitable for application that required supply current up to 100mA.



Internal Block Diagram



Rev. 1.0.2

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Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Input Voltage (for V_O = 5V, 8V) (for V_O = 12V to 18V) (for V_O = 24V	V_I	30 35 40	V V V
Operating Junction Temperature Range	T_J	0 ~ +150	C
Storage Temperature Range	T_{STG}	-65 ~ +150	C

Electrical Characteristics(KA78L05A)

(V_I = 10V, I_O = 40mA, 0 C T_J 125 C, C_I = 0.33 F, C_O = 0.1 F, unless otherwise specified. (Note 1)

Parameter		Symbol	Conditions		Min.	Typ.	Max.	Unit
Output Voltage		V_O	T_J = 25°C		4.8	5.0	5.2	V
Line Regulation (Note1)		V_O	T_J = 25°C	7V V_I 20V	-	8	150	mV
				8V V_I 20V	-	6	100	mV
Load Regulation (Note1)		V_O	T_J = 25°C	1mA I_O 100mA	-	11	60	mV
				1mA I_O 40mA	-	5.0	30	mV
Output Voltage		V_O	7V V_I 0V	1mA I_O 40mA	-	-	5.25	V
			7V V_I V_{MAX} (Note 2)	1mA I_O 70mA	4.75	-	5.25	V
Quiescent Current		I_Q	T_J = 25°C			2.0	5.5	mA
Quiescent Current Change	with line	I_Q	8V V_I 20V		-	-	1.5	mA
	with load	I_Q	1mA I_O 40 mA		-	-	0.1	mA
Output Noise Voltage		V_N	T_A = 25°C, 10Hz f 100KHz		-	40	-	V/Vo
Temperature Coefficient of V_O		V_O/ T	I_O = 5mA		-	-0.65	-	mV/ C
Ripple Rejection		RR	f = 120Hz, 8V V_I 18V, T_J = 25°C		41	80	-	dB
Dropout Voltage		V_D	T_J = 25°C		-	1.7	-	V

Note:

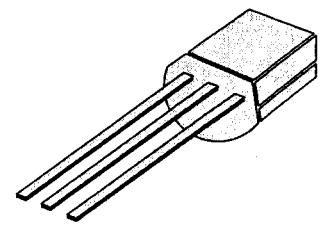
1. The maximum steady state usable output current and input voltage are very dependent on the heat sinking and/or lead length of the package. The data above represent pulse test conditions with junction temperature as indicated at the initiation of tes ts.
2. Power dissipation P_D 0.75W.

KSR1005 NPN EPITAXIAL SILICON TRANSISTOR

SWITCHING APPLICATION (Bias Resistor Built In)

† Switching Circuit, Inverter, Interface circuit Driver circuit.
† Built in bias Resistor (R,=4.7KΩ, R=10KΩ)
† Complement to KSR2005

TO-92



1 Emitter 2 Collector 3 Base

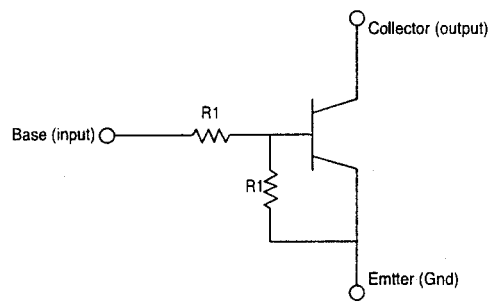
ABSOLUTE MAXIMUM RATINGS (Ta=25°C

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	50	V
Collector-Emitter Voltage	V_{CBO}	50	V
Emitter-Base Voltage	V_{CBO}	10	V
Collector Current	I_C	100	mA
Collector Dissipation	P_C	300	mW
Junction Temperature	T_I	150	°C
Storage Temperature	T_{stg}	-55-150	°C

ELECTRICAL CHARACTERISTICS (Ta=25°C

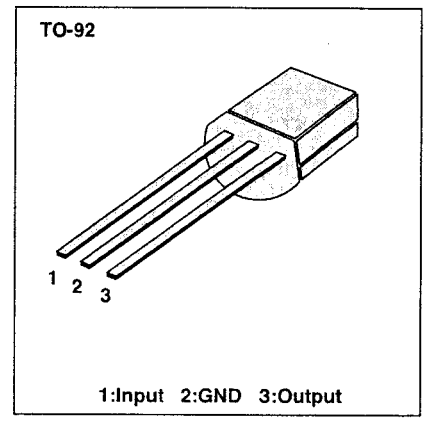
Characteristic	Symbol	Test Condition	Main	Typ	Max	Unit
Collector-Base Breakdown Voltage	BV_{CBO}	I_C=10uA, I_B=0	50			V
Collector-Emitter Breakdown Voltage	BV_{CBO}	I_C=100uA, I_B=0	50			V
Collector Cutoff Current	I_{CBO}	V_{CB}=40V, I_B=0			0.1	uA
DC Current Gain	H_C	V_{CB}=5V, I_B=5mA	30			
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=10mA, I_B=0.5mA			0.3	V
Output Capacitance	C_{ob}	V_{CB}=10V, I_B=0 t=1MHz		3.7		pF
Current Gain-Bandwidth Product	F_T	V_{CB}=10V, I_C=5mA		250		MHz
Input Off Voltage	$V_{i(off)}$	V_{CB}=5V, I_C=100uA	0.3			V
Input On Voltage	$V_{i(off)}$	V_{CB}=0.3V, I_C=20mA			2.5	V
Input Resistor	R_1		3.2	4.7	6.2	KΩ
Resistor Ratio	R_1/R_2		0.42	0.47	0.52	

Equivalent Circuit



12-3 3.3V VOLTAGE DETECTOR

The KA7533 prevents error system from supply voltage below normal voltage level at the time the power on and instantaneous power off in systems.



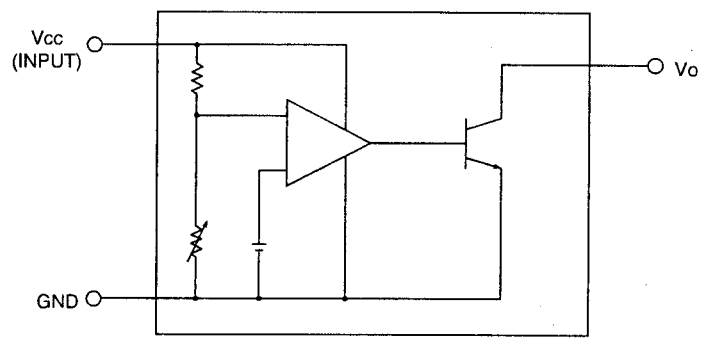
I>FEATURES

- Detecting against error operations at the power ON/OFF.
- Resetting function for the low voltage microprocessor.
- Checking low battery.

I>ORDERING INFORMATION

Device	Package	Operating Temperature
KA7533Z	TO-92	−30 ~ +75°C

I>BLOCK DIAGRAM



Absolute Maximum Rating (T_A=25°C)

Characteristic	Symbol	Value	Unit
Supply Voltage	V_{CC}	0.3 ~ + 15.0	V
Detecting Voltage	V_{DET}	2.5/2.7/2.9/3.1 3.3/3.6/3.9/4.2/4.5	V
Hysteresis Voltage	V_{HYS}	50	mV
Operating Temperature	T_{OPR}	- 25 ~ + 85	°C
Storage Temperature	T_{STG}	- 50 ~ + 150	°C
Power Dissipation	P_D	200	mW
Detecting Voltage Temperature Coefficient	$\Delta V_{DET}/\ T$	R_L = 200 , +0.01	%/ °C

Electrical Characteristics (T_A=25°C)

Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit
Detecting Voltage	V_{DET}	R_L=200Ω $V_{OL} \leq$0.4V	KA75250	2.35	2.5	2.65	V
			KA75270	2.55	2.7	2.85	
			KA75290	2.75	2.9	3.05	
			KA75310	2.95	3.1	3.25	
			KA75330	3.15	3.3	3.45	
			KA75360	3.45	3.6	3.75	
			KA75390	3.75	3.9	4.05	
			KA75420	4.05	4.2	4.35	
			KA75450	4.35	4.5	4.65	
Low Output Voltage	V_{OL}	R_L=200 Ω		-	-	0.4	V
Output Leakage Current	I_{LKG}	V_{CC}=15V		-	-	0.1	uA
Hysteresis Voltage	V_{HYS}	R_L=200 Ω		30	50	100	mV
Detecting Voltage Temperature Coefficient	$V_{DET}/\ T$	R_L=200 Ω		-	±0.01	-	%/°C
Circuit Current(at on time)	I_{CCL}	$V_{CC}=V_{DET(MIN)}$-0.05V		-	300	500	uA
Circuit Current(at off time)	I_{CCH}	V_{CC}=5.25V		-	30	50	uA
Threshold Operating Voltage	$V_{TH(OPR)}$	R_L=200Ω, $V_{OL} \leq$0.4V		-	0.8	1.0	V
" L"± Transmission Delay Time	T_{OL}	R_L=1.0KΩ, C_L=100pF		0.6	10	-	uS
" H"± Transmission Delay Time	T_{OH}	R_L=1.0KΩ, C_L=100pF		-	15	20	uS
Output Current (at on time)	I_{OLI}	$V_{CC}=V_{DET(MIN)}$ -0.05V, T_A=25°C		10	20	30	mA
Output Current (at on time)	I_{OLII}	$V_{CC}=V_{DET(MIN)}$ - 0.05V T_A= -25 ~ + 85°C		8	16	30	mA

Features

- **Low-voltage and Standard-voltage Operation**
  - **5.0 (V_{CC} = 4.5V to 5.5V)**
  - **2.7 (V_{CC} = 2.7V to 5.5V)**
  - **2.5 (V_{CC} = 2.5V to 5.5V)**
  - **1.8 (V_{CC} = 1.8V to 5.5V)**
- **User-selectable Internal Organization**
  - **1K: 128 x 8 or 64 x 16**
  - **2K: 256 x 8 or 128 x 16**
  - **4K: 512 x 8 or 256 x 16**
- **3-wire Serial Interface**
- **2 MHz Clock Rate (5V) Compatibility**
- **Self-timed Write Cycle (10 ms max)**
- **High Reliability**
  - **Endurance: 1 Million Write Cycles**
  - **Data Retention: 100 Years**
  - **ESD Protection: >4000V**
- **Automotive Grade and Extended Temperature Devices Available**
- **8-pin PDIP, 8-lead JEDEC and EIAJ SOIC, and 8-lead TSSOP Packages**

Description

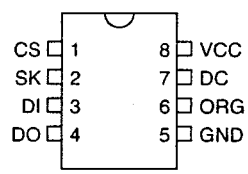
The AT93C46/56/57/66 provides 1024/2048/4096 bits of serial electrically erasable programmable read only memory (EEPROM) organized as 64/128/256 words of 16 bits each, when the ORG pin is connected to V_{CC} and 128/256/512 words of 8 bits each when it is tied to ground. The device is optimized for use in many industrial and commercial applications where low power and low voltage operations are essential. The AT93C46/56/57/66 is available in space saving 8-pin PDIP and 8-lead JEDEC and EIAJ SOIC packages.

(continued)

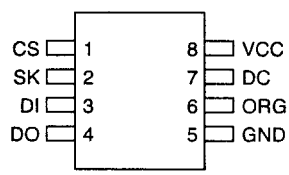
Pin Configurations

Pin Name	Function
CS	Chip Select
SK	Serial Data Clock
DI	Serial Data Input
DO	Serial Data Output
GND	Ground
VCC	Power Supply
ORG	Internal Organization
DC	Don't Connect

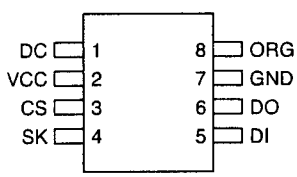
8-pin PDIP



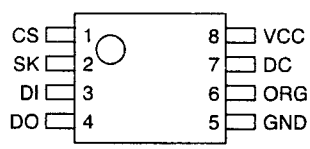
8-lead SOIC



8-lead SOIC
Rotated (R)
(1K JEDEC Only)



8-lead TSSOP



3-wire Serial EEPROMs

1K (128 x 8 or 64 x 16)

2K (256 x 8 or 128 x 16)

4K (512 x 8 or 256 x 16)

AT93C46
AT93C56
AT93C57
AT93C66

Rev. 0172L-1 0/99

The AT93C46/56/57/66 is enabled through the Chip Select pin (CS), and accessed via a 3-wire serial interface consisting of Data Input (DI), Data Output (DO), and Shift Clock (SK). Upon receiving a READ instruction at DI, the address is decoded and the data is clocked out serially on the data output pin DO. The WRITE cycle is completely self-timed and no separate ERASE cycle is required before WRITE. The WRITE cycle is only enabled when the part is in the ERASE/WRITE ENABLE state. When CS is brought "high" following the initiation of a WRITE cycle, the DO pin outputs the READY/BUSY status of the part.

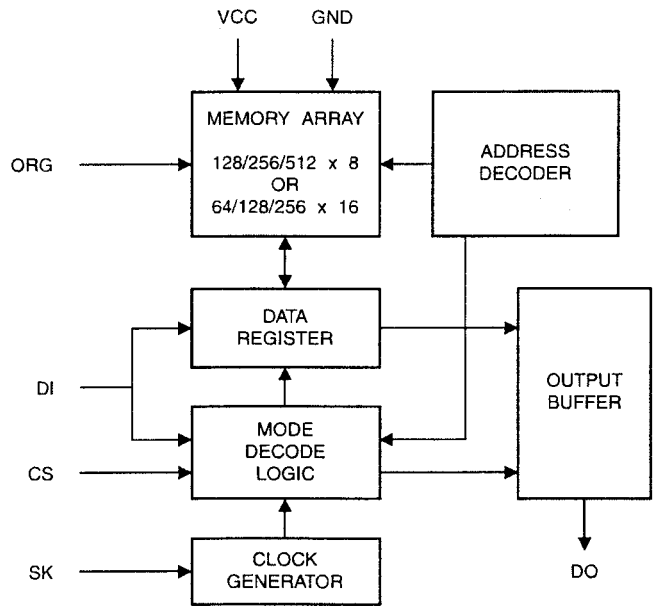
The AT93C46 is available in 4.5V to 5.5V, 2.7V to 5.5V, 2.5V to 5.5V, and 1.8V to 5.5V versions. The AT93C56/57/66 is available in 4.5V to 5.5V, 2.7V to 5.5V, and 2.5V to 5.5V versions.

Absolute Maximum Ratings*

Operating Temperature	-55°C to +125°C
Storage Temperature	-65°C to +150°C
Voltage on Any Pin with Respect to Ground	-1.0V to +7.0V
Maximum Operating Voltage	6.25V
DC Output Current	5.0 mA

*NOTICE: Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability

Block Diagram



Note: 1. When the ORG pin is connected to V_{CC}, the x 16 organization is selected. When it is connected to ground, the x 8 organization is selected. If the ORG pin is left unconnected, then an internal pullup device (of approximately 1 M) will select the 16 organization. This feature is not available on 1.8V devices.

Pin Capacitance[1]

Applicable over recommended operating range from T_A = 25°C, f = 1.0 MHz, V_{CC} = +5.0V (unless otherwise noted).

Symbol	Test Conditions	Max	Units	Conditions
C_{OUT}	Output Capacitance (DO)	5	pF	V_{OUT} = 0V
C_{IN}	Input Capacitance (CS, SK, DI)	5	pF	V_{IN} = 0V

Note: 1. This parameter is characterized and is not 100% tested.

DC Characteristics

Applicable over recommended operating range from: T_{AI} = -40°C to +85°C, V_{CC} = +1.8V to +5.5V, T_{AC} = 0°C to +70°C, V_{CC} = +1.8V to +5.5V (unless otherwise noted).

Symbol	Parameter	Test Condition		Min	Typ	Max	Unit
V_{CC1}	Supply Voltage			1.8		5.5	V
V_{CC2}	Supply Voltage			2.5		5.5	V
V_{CC3}	Supply Voltage			2.7		5.5	V
V_{CC4}	Supply Voltage			4.5		5.5	V
I_{CC}	Supply Current	V_{CC} = 5.0V	READ at 1.0 MHz		0.5	2.0	mA
			WRITE at 1.0 MHz		0.5	2.0	mA
I_{SB1}	Standby Current	V_{CC} = 1.8V	CS = 0V		0	0.1	µA
I_{SB2}	Standby Current	V_{CC} = 2.5V	CS = 0V		6.0	10.0	µA
I_{SB3}	Standby Current	V_{CC} = 2.7V	CS = 0V		6.0	10.0	µA
I_{SB4}	Standby Current	V_{CC} = 5.0V	CS = 0V		17	30	µA
I_{IL}	Input Leakage	V_{IN} = 0V to V_{CC}	0.		1	1.0	µA
I_{OL}	Output Leakage	V_{IN} = 0V to V_{CC}	0.		1	1.0	µA
V_{IL1}[1] V_{IH1}[1]	Input Low Voltage Input High Voltage	4.5V V_{CC} 5.5V		-0.6 2.0		0.8 V_{CC} + 1	V
V_{IL2}[1] V_{IH2}[1]	Input Low Voltage Input High Voltage	1.8V V_{CC} 2.7V		-0.6 V_{CC} x 0.7		V_{CC} x 0.3 V_{CC} + 1	V
V_{OL1} V_{OH1}	Output Low Voltage Output High Voltage	4.5V V_{CC} 5.5V	I_{OL} = 2.1 mA			0.4	V
			I_{OH} = -0.4 mA	2.4			V
V_{OL2} V_{OH2}	Output Low Voltage Output High Voltage	1.8V V_{CC} 2.7V	I_{OL} = 0.15 mA			0.2	V
			I_{OH} = -100 µA	V_{CC} - 0.2			V

Note: 1. V_{IL} min and V_{IH} max are reference only and are not tested.

INTEGRATED CIRCUIT

TOSHIBA TECHNICAL DATA

TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT

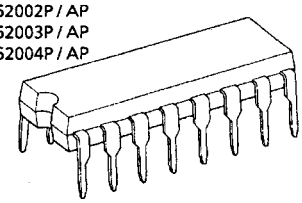
TD62001P, TD62001AP, TD62001F, TD62001AF
TD62002P, TD62002AP, TD62002F, TD62002AF
TD62003P, TD62003AP, TD62003F, TD62003AF
TD62004P, TD62004AP, TD62004F, TD62004AF

SILICON MONOLITHIC

7CH DARLINGTON SINK DRIVER

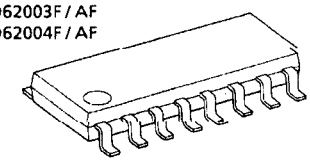
The TD62001P/AP/F/AF Series are high-voltage, high-current darlington drivers comprised of seven NPN darlington pairs.
All units feature integral clamp diodes for switching inductive loads.
Applications include relay, hammer, lamp and display (LED) drivers.

TD62001P/AP
TD62002P/AP
TD62003P/AP
TD62004P/AP



DIP16-P-300A

TD62001F/AF
TD62002F/AF
TD62003F/AF
TD62004F/AF



SOP16-P-225

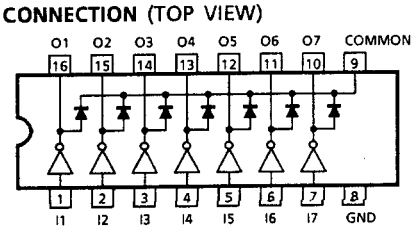
Weight DIP16-P-300A : 1.11g (Type)
SOP16-P-225 : 0.16g (Type)

FEATURES

- Output current (single output) 500mA MAX.
- High sustaining voltage output
  35V MIN. (TD62001P/F Series)
  50V MIN. (TD62001AP/AF Series)
- Output clamp diodes
- Inputs compatible with various types of logic
- Package Type-P, AP : DIP-16pin
- Package Type-F, AF : SOP-16pin

TYPE	INPUT BASE RESISTOR	DESIGNATION
TD62001P/AP/F/AF	External	General Purpose
TD62002P/AP/F/AF	10.5-kΩ + 7V Zenner diode	14~25V PMOS
TD62003P/AP/F/AF	2.7kΩ	TTL, 5V CMOS
TD62004P/AP/F/AF	10.5kΩ	6~15V PMOS, CMOS

PIN CONNECTION (TOP VIEW)



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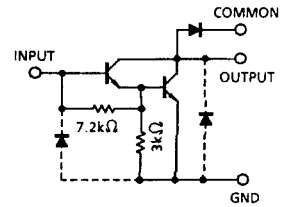
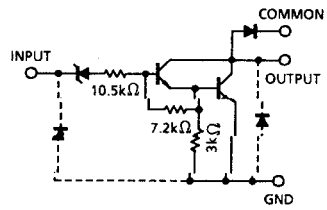
SCHEMATICS (EACH DRIVER)

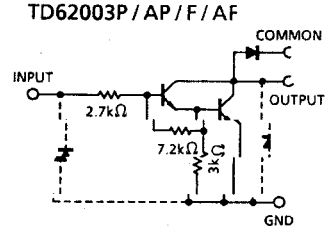
TD62001P / AP / F / AF



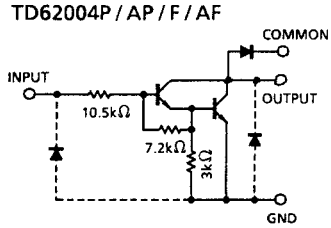
TD62002P / AP / F / AF



TD62003P / AP / F / AF



TD62004P / AP / F / AF



(Note) The input and output parasitic diodes cannot be used as clamp diodes.

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Output Sustaining Voltage	P, F	$V_{CE\ (SUS)}$	−0.5~35	V
	AP, AF		−0.5~50	
Output Current		I_{OUT}	500	mA / ch
Input Voltage		V_{IN} (Note 1)	−0.5~30	V
Input Current		I_{IN} (Note 2)	25	mA
Clamp Diode Reverse Voltage	P, F	V_R	35	V
	AP, AF		50	
Clamp Diode Forward Current		I_F	500	mA
Power Dissipation	P	P_D	1.0	W
	AP		1.47	
	F, AF		0.54 / 0.69 (Note 3)	
Operating Temperature	P	T_{opr}	−30~75	°C
	AP, F, AF		−40~85	
Storage Temperature		T_{stg}	−55~150	°C

(Note 1) Except TD62001P / AP / F / AF
(Note 2) Only TD62001P / AP / F / AF
(Note 3) On glass epoxy PCB (30 × 30 × 1.6mm Cu 50%)

RECOMMENDED OPERATING CONDITIONS (Ta = −40~85°C and Ta = −30~75°C for only Type-P)

CHARACTERISTIC		SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT
Output Sustaining Voltage	P, F	$V_{CE\ (SUS)}$			0	—	35	V
	AP, AF				0	—	50	
Output Current	AP	I_{OUT}	T_{pw} = 25ms, 7 Circuits, Ta = 85°C, T_j = 120°C	Duty = 10%	0	—	370	mA / ch
				Duty = 50%	0	—	130	
	P			Duty = 10%	0	—	295	
				Duty = 50%	0	—	95	
	F, AF			Duty = 10%	0	—	233	
				Duty = 50%	0	—	70	
Input Voltage	Except TD62001P / AP / F / AF	V_{IN}			0	—	24	V
Input Voltage (Output On)	TD62002	$V_{IN\ (ON)}$	I_{OUT} = 400mA, h_{FE} = 800		14.5	—	24	V
	TD62003				2.8	—	24	
	TD62004				6.2	—	24	
Input Voltage (Output Off)	TD62001	$V_{IN\ (OFF)}$			0	—	0.6	V
	TD62002				0	—	7.4	
	TD62003				0	—	0.7	
	TD62004				0	—	1.0	
Input Current	Only TD62001	I_{IN}			0	—	10	mA
Clamp Diode Reverse Voltage	P, F	V_R			—	—	35	V
	AP, AF				—	—	50	
Clamp Diode Forward Current		I_F			—	—	350	mA
Power Dissipation	P	P_D	Ta = 85°C		—	—	0.6	W
	AP				—	—	0.76	
	AF, F		(Note) Ta = 85°C		—	—	0.36	

(Note) On glass epoxy PCB (30 × 30 × 1.6mm Cu 50%)

ELECTRICAL CHARACTERISTICS (Ta = 25°C unless otherwise noted)

CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Leakage Current	AP, AF	I_{CEX}	1	V_{CE} = 50V, Ta = 25°C	—	—	50	μA
				V_{CE} = 50V, Ta = 85°C	—	—	100	
	F			V_{CE} = 35V, Ta = 25°C	—	—	50	
				V_{CE} = 35V, Ta = 85°C	—	—	100	
	P			V_{CE} = 35V, Ta = 25°C	—	—	50	
				V_{CE} = 35V, Ta = 75°C	—	—	100	
Collector-Emitter Saturation Voltage		$V_{CE\ (sat)}$	2	I_{OUT} = 350mA, I_{IN} = 500μA	—	1.3	1.6	V
				I_{OUT} = 200mA, I_{IN} = 350μA	—	1.1	1.3	
				I_{OUT} = 100mA, I_{IN} = 250μA	—	0.9	1.1	
DC Current Transfer Ratio		h_{FE}	2	V_{CE} = 2V, I_{OUT} = 350mA	1000	—	—	
Input Current (Output On)	TD62002	$I_{IN\ (ON)}$	3	V_{IN} = 20V, I_{OUT} = 350mA	—	1.1	1.7	mA
	TD62003			V_{IN} = 2.4V, I_{OUT} = 350mA	—	0.4	0.7	
	TD62004			V_{IN} = 9.5V, I_{OUT} = 350mA	—	0.8	1.2	
Input Current (Output Off)	P	$I_{IN\ (OFF)}$	4	I_{OUT} = 500μA, Ta = 75°C	50	65	—	μA
	AP, F, AF			I_{OUT} = 500μA, Ta = 85°C	50	65	—	
Input Voltage (Output On)	TD62002	$V_{IN\ (ON)}$	5	V_{CE} = 2V, h_{FE} = 800, I_{OUT} = 350mA	—	—	13.7	V
				V_{CE} = 2V, h_{FE} = 800, I_{OUT} = 200mA	—	—	11.4	
	TD62003			V_{CE} = 2V, h_{FE} = 800, I_{OUT} = 350mA	—	—	2.6	
				V_{CE} = 2V, h_{FE} = 800, I_{OUT} = 200mA	—	—	2.0	
	TD62004			V_{CE} = 2V, h_{FE} = 800, I_{OUT} = 350mA	—	—	4.7	
				V_{CE} = 2V, h_{FE} = 800, I_{OUT} = 200mA	—	—	4.4	
Clamp Diode Reverse Current	AP, AF	I_R	6	V_R = 50V, Ta = 25°C	—	—	50	μA
				V_R = 50V, Ta = 85°C	—	—	100	
	F			V_R = 35V, Ta = 25°C	—	—	50	
				V_R = 35V, Ta = 85°C	—	—	100	
	P			V_R = 35V, Ta = 25°C	—	—	50	
				V_R = 35V, Ta = 75°C	—	—	100	
Clamp Diode Forward Voltage		V_F	7	I_F = 350mA	—	—	2.0	V
Input Capacitance		C_{IN}	—		—	15	—	pF
Turn-On Delay	P, F	t_{ON}	8	V_{OUT} = 35V, R_L = 87.5Ω, C_L = 15pF	—	0.1	—	μs
	AP, AF			V_{OUT} = 50V, R_L = 125Ω, C_L = 15pF	—	0.1	—	
Turn-Off Delay	P, F	t_{OFF}	8	V_{OUT} = 35V, R_L = 87.5Ω, C_L = 15pF	—	0.2	—	
	AP, AF			V_{OUT} = 50V, R_L = 125Ω, C_L = 15pF	—	0.2	—	

INTEGRATED CIRCUIT

TOSHIBA

TECHNICAL DATA

TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT

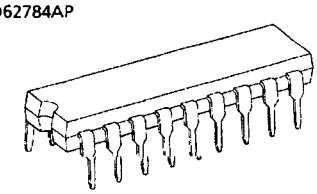
TD62783AP, TD62783F, TD62783AF
TD62784AP, TD62784F, TD62784AF

SILICON MONOLITHIC

8CH HIGH-VOLTAGE SOURCE DRIVER

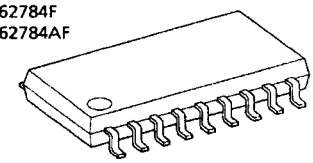
The TD62783AP/F/AF Series are comprised of eight source current Transistor Array.
These drivers are specifically designed for fluorescent display applications.
Applications include relay, hammer and lamp drivers.

TD62783AP
TD62784AP



DIP18-P-300D

TD62783F
TD62783AF
TD62784F
TD62784AF



SOP18-P-375

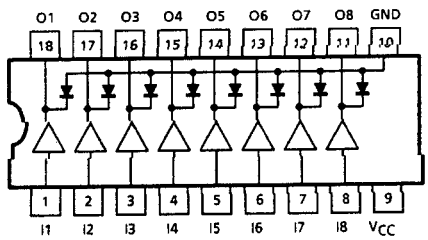
Weight DIP18-P-300D : 1.47g (Type.)
SOP18-P-375 : 0.41g (Type)

FEATURES

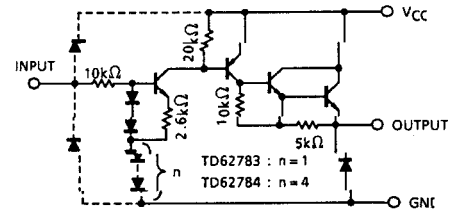
- High output voltage Type-AP, AF : V_{CC} = 50V MIN.
  Type-F : V_{CC} = 35V MIN.
- Output current (single output) I_{OUT} = −500mA MIN.
- Output clamp diodes
- Single supply voltage
- Input compatible with various types of logic
- Package Type-AP : DIP-18pin
- Package Type-F, AF : SOP-18pin

TYPE	DESIGNATION
TD62783AP/F/AF	TTL, 5V CMOS
TD62784AP/F/AF	6~15V PMOS, CMOS

PIN CONNECTION (TOP VIEW)



SCHEMATICS (EACH DRIVER)



(Note) The input and output parasitic diodes cannot be used as clamp diodes.

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MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage	AP, AF	V_{CC}	50	V
	F		35	
Output Current		I_{OUT}	−500	mA / ch
Input Voltage		V_{IN} (Note 1)	15	V
		V_{IN} (Note 2)	30	
Clamp Diode Reverse Voltage	AP, AF	V_R	50	V
	F		35	
Clamp Diode Forward Current		I_F	500	mA
Power Dissipation	AP	P_D (Note 3)	1.47	W
	F, AF		0.96	
Operating Temperature		T_{opr}	−40~85	°C
Storage Temperature		T_{stg}	−55~150	°C

(Note 1) Only TD62783AP / F / AF
(Note 2) Only TD62784AP / F / AF
(Note 3) Delated above 25°C in the proportion of 11.7W / °C (AP Type), 7.7W / °C (F, AF Type).

RECOMMENDED OPERATING CONDITIONS (Ta = −40~85°C)

CHARACTERISTIC			SYMBOL	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Supply Voltage		AP, AF	V_{CC}	—		—	—	50	V
		F		—		—	—	35	
Output Current			I_{OUT}	Ta = 85°C, T_j = 120°C, T_{pw} = 25ms	Duty = 10% 8 Circuits	—	—	−260	mA / c
					Duty = 50% 8 Circuits	—	—	−59	
					Duty = 10% 8 Circuits	—	—	−180	
		AF, F			Duty = 50% 8 Circuits	—	—	−38	
Input Voltage		TD62783AP / F / AF	V_{IN}	—		—	—	12	V
		TD62784AP / F / AF		—		—	—	24	
Input Voltage	Output On	TD62783AP / F / AF	V_{IN} (ON)	—		2.0	5.0	15	V
		TD62784AP / F / AF		—		4.5	12.0	30	
	Output Off	TD62783AP / F / AF	V_{IN} (OFF)	—		0	—	0.8	
		TD62784AP / F / AF		—		0	—	2.0	
Clamp Diode Reverse Voltage		AP	V_R	—		—	—	50	V
		F, AF		—		—	—	35	
Clamp Diode Forward Current			I_F	—		—	—	400	mA
Power Dissipation		AP	P_D	—		—	—	0.52	W
		F, AF		—		—	—	0.35	

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Leakage Current		I_{CEX}	1	$V_{CC} = V_{CC}$ MAX. $V_{IN} = 0.4V$, Ta = 25°C	—	—	100	μA
Output Saturation Voltage		$V_{CE (sat)}$	2	$V_{IN} = V_{IN (ON)}$, $I_{OUT} = -350mA$	—	—	2.0	V
				$V_{IN} = V_{IN (ON)}$, $I_{OUT} = -225mA$	—	—	1.9	
				$V_{IN} = V_{IN (ON)}$, $I_{OUT} = -100mA$	—	—	1.8	
Input Current	TD62783AP / F / AF	$I_{IN (ON)}$	3	$V_{IN} = 2.4V$	—	36	52	μA
				$V_{IN} = 3.85V$	—	180	260	
	TD62784AP / F / AF			$V_{IN} = 5V$	—	92	130	
				$V_{IN} = 12V$	—	790	1130	
Input Voltage	TD62783AP / F / AF	$V_{IN (ON)}$	4	$V_{CE} = 2.0V$	—	—	2.0	V
	TD62784AP / F / AF			$I_{OUT} = -350mA$	—	—	4.5	
	TD62783AP / F / AF	$V_{IN (OFF)}$		$I_{OUT} = -500\mu A$	0.8	—	—	
	TD62784AP / F / AF				2.0	—	—	
Supply Current		$I_{CC (ON)}$	3	$V_{IN} = V_{IN (ON)}$, $V_{CC} = 50V$	—	—	2.5	mA / c
Clamp Diode Reverse Current	AP, AF	I_R	5	$V_R = 50V$	—	—	50	μA
	F			$V_R = 35V$	—	—	50	
Clamp Diode Forward Voltage		V_F	6	$I_F = 350mA$	—	—	2.0	V
Turn-On Delay		t_{ON}	7	$V_{CC} = V_{CC}$ MAX. $R_L = 125\Omega$, $C_L = 15pF$, $R_L = 88\Omega$ (F)	—	0.15	—	μs
Turn-Off Delay		t_{OFF}			—	1.8	—	